The IRON AGE

February 25, 1960 A Chilton Publication The National Metalworking Weekly

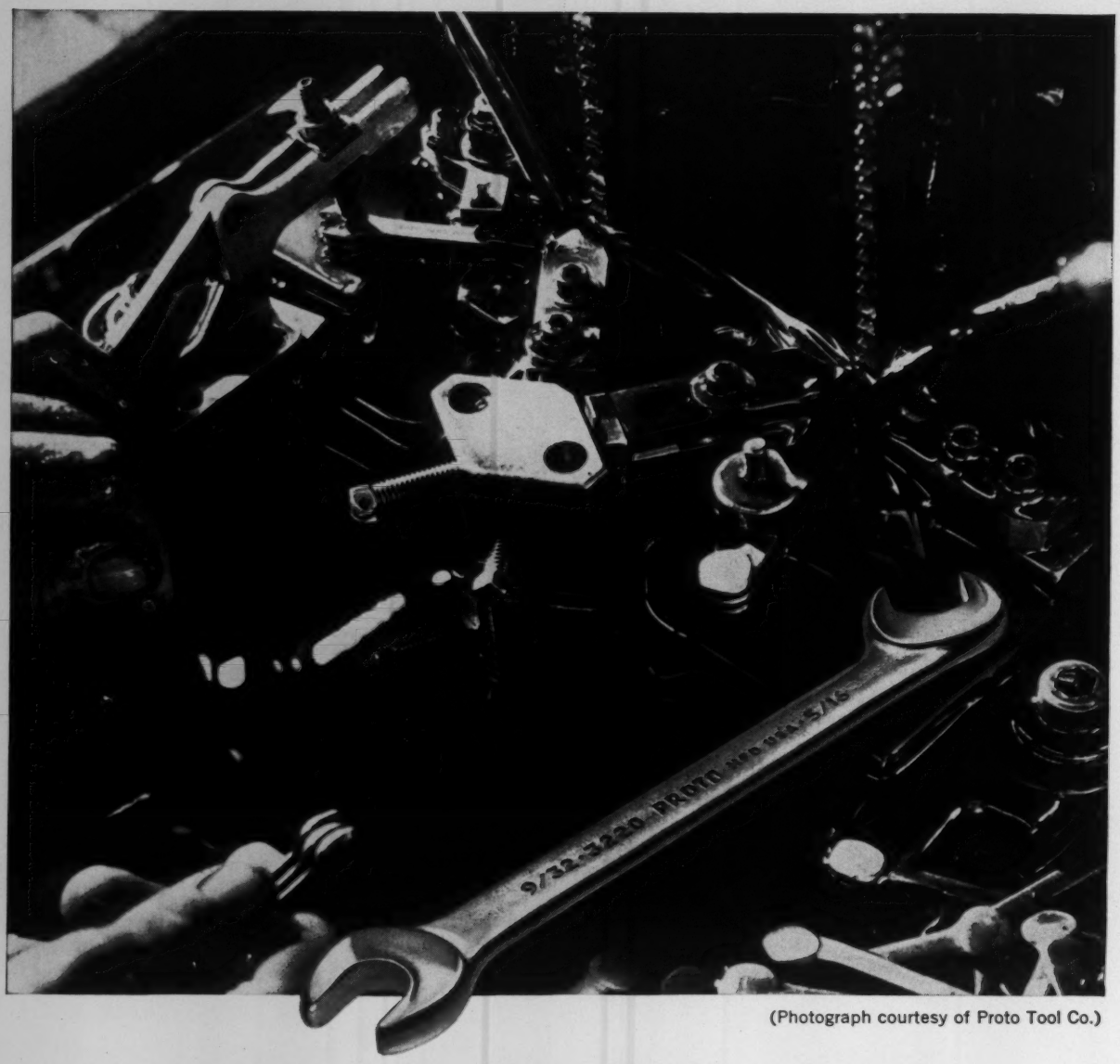
Fisher Body's Holmes and Fletcher—

Moving Bolsters Double Press Line Output P. 63

Fastener Makers Tool Up for New Role – P. 23

How to Market A Major Process – P. 30

Digest of the Week – P. 2-3



(Photograph courtesy of Proto Tool Co.)

Uniform hardenability . . . prime requirement for high-speed broaching

The most demanding requirement of steel used in high-speed broaching operations is bar-to-bar and heat-to-heat uniformity. Even slight variations, particularly in hardness, can result in tool breakage, lost production time, and expensive retooling.

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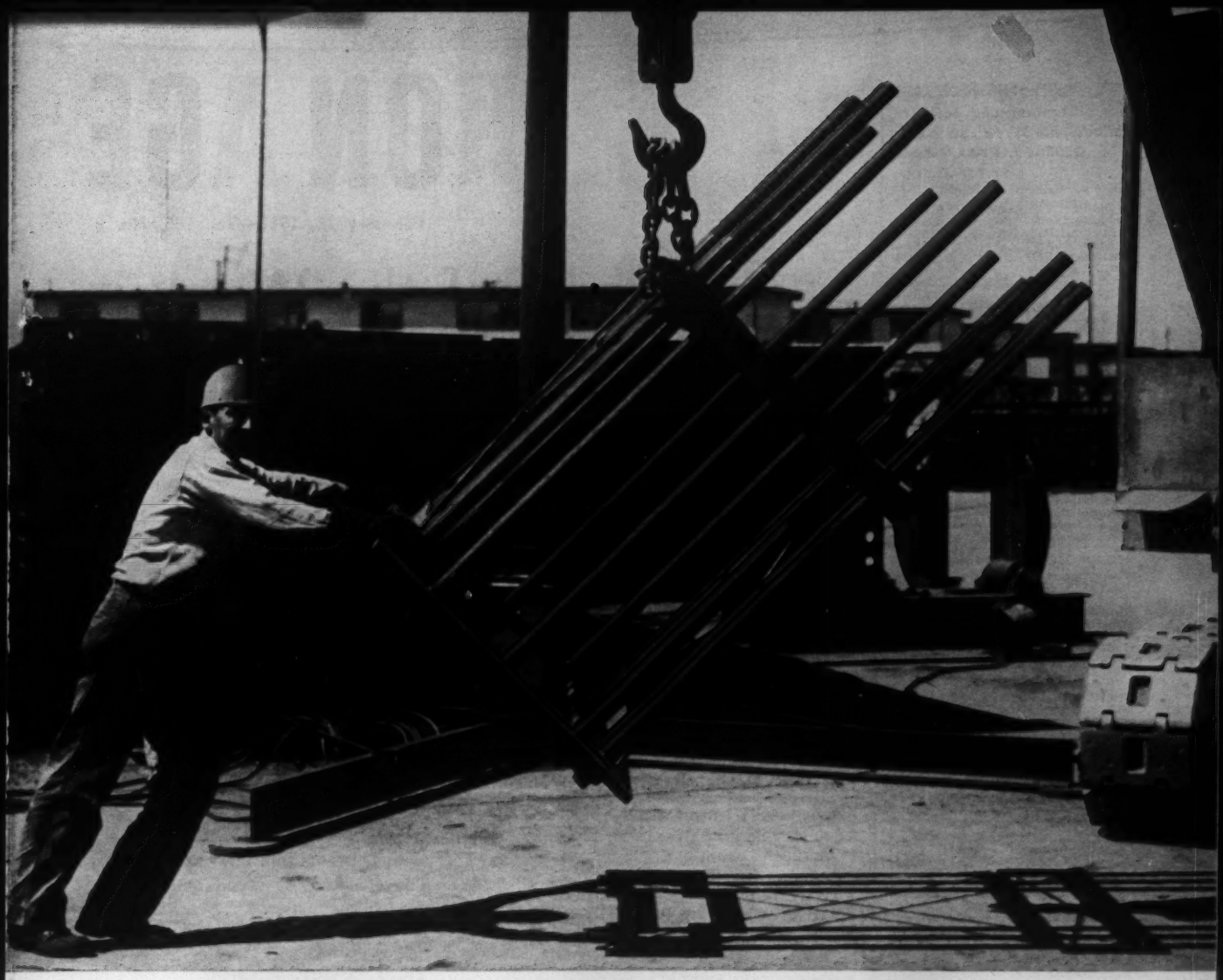

Big bolts for the Giants' ball park

Threaded foundation bolts, two inches in diameter and eight feet long, 14 of them in all, were welded into this mammoth cage. This section will be embedded in concrete as an anchor for one of several steel shafts supporting the lighting system for the San Francisco Giants' new Candlestick Stadium.

The range of Bethlehem standard fasteners is wide enough to handle most bolting requirements. But quite often a special job, such as this one, calls for a special fastener designed to meet the specific need.

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Candlestick Stadium, the new home of the San Francisco Giants

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The IRON AGE

February 25, 1960—Vol. 185, No. 8

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News of the Industry

FASTENERS

Business Booms — Most fastener makers are putting a large share

of their profits into new equipment. They want more speed and lower production costs. P. 23

ANTI-TRUST ACTION

Mergers Opposed — Recent government action appears aimed at any movement of a basic metal producer to go into fabrication. Affected companies are determined to fight it out. P. 25

AUTOMATE MANAGERS

With Computers — Companies are now using electronic computers to run individual machines and overall plant operations. Few production workers are affected. The aim is to speed the work of managers. P. 28

SPACE MARKETING

Special Problems — As missile and space programs grow more

Metalworking

Cover Feature

STAMPING LINE: Big gains in production can be achieved by using a spare bolster in stamping line operations. Fisher Body Div.'s T. C. Fletcher and Vern Holmes have seen the results: Less set-up time and doubled output. P. 63

complex in the future, the problems of selling to this market will also become more complex. And there are no easy solutions in sight. P. 29

WEST COAST

TV Classroom — Companies in southern Calif. sponsor program for employees taking engineering courses. P. 45

Engineering-Production Developments

PREPARING TANK SEAMS

For Welding—One tank fabricator is transforming square butt joints into U-shaped grooves with an automatic arc gouging torch. The technique plays a dual role. First, heat from the arc melts the metal. And at the same time compressed air from the torch head blows the metal away. P. 66

REFRACTORY NOZZLES

Give Them Pressure — Erosion and failure of refractory nozzles have long been a problem during casting. Recent production line experience shows that pressure impregnation of nozzles can result in steel improvement equal to 2-8¢ per ton. It means higher capacity for open-hearth and electric furnaces. P. 68

ADDING COLUMBIUM

To Killed Steel—Recent studies point up the effect of columbium in retarding grain growth in killed steels. Tests also show that small amounts of columbium increase the yield strength without a loss in ductility. SAE 1035, aluminum-killed, was the steel studied. P. 72

MEASURING LOADS

On Bolted Joints—Bolted assemblies can be improved if you know the forces imposed upon the joints. A case in point is a study into the use of aluminum in bolted bus bars. Findings show no relaxation of the initial bolt load nor any yielding of the bus bar. P. 74

SANITARY FINISHES

On Stainless — Increasing demand for containers to handle dairy and food products puts a premium on production of required finishes. While there are no fast rules regarding production, standard procedures do help to achieve uniform quality in sanitary finishes. P. 76

Market and Price Trends

MARKETING A PROCESS

Planning Pays Off — Koppers and Strategic Materials proved how sound planning pays off in introducing a new process. Their success with the Strategic-Udy process shows how it can be done. P. 30

MACHINE TOOLS

"Custom" Engineering — Consumer demands for a wide range of choices mean the end to many long production runs. Today's tool engineer has the problem of preserving automation, but for shorter runs. P. 47

STEEL SUMMARY

Back to Normal—Steel users are now ordering at the rate of consumption. With the end of inventory buildup, steel operations will drop into the low 80's in the second quarter. Estimate of total steel production for the year is revised to 120 to 125 million tons. P. 199

PURCHASING

The System — A Blaw-Knox Co. executive tells how he set up an efficient purchasing system. Cooperative approach is one of the basic rules, he says. P. 120

NEXT WEEK

CUTTING OILS, COOLANTS

Their Functions — Cutting oils and coolants are next week's subjects in the prize-winning series, "How to Get More for Your Metalworking Dollar." It will help you get more economical mileage from every drop of cutting oil or coolant.

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AM 350 is available commercially in sheet, strip, foil, small bars and wire. AM 355, best suited for heavier sections, is available commercially in forgings, forging billets, plates, bars, wire, sheet and strip.

For further information, see your A-L sales engineer or write for the new technical booklet, "AM 350 and AM 355." **Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.**

863

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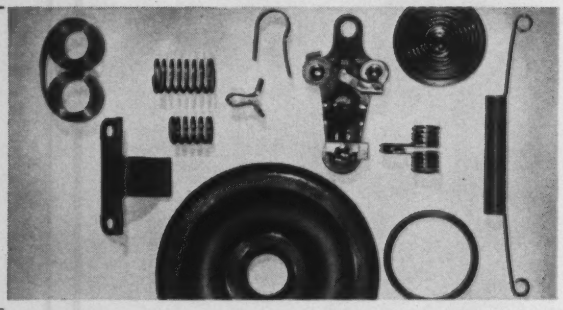
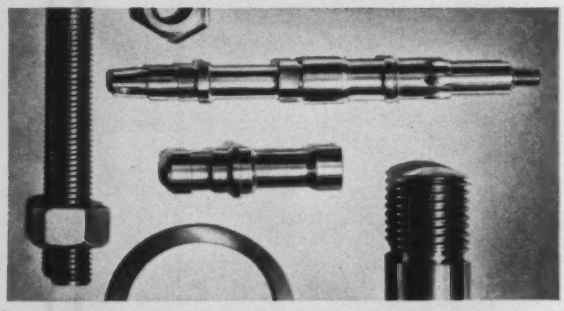
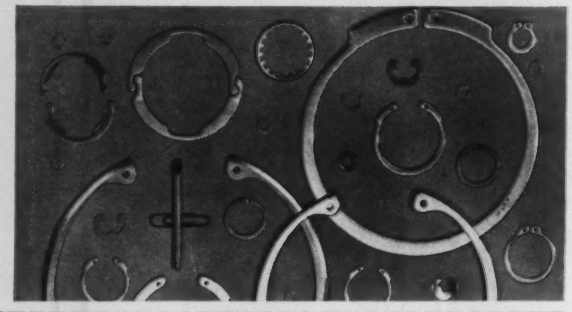


Armco 17-4 PH is specified extensively for shafts, fasteners, valves, and other applications where its strength and corrosion resistance mean longer, more dependable service at less cost. The high hardness and durability of 17-4 PH combine to resist corrosion-fatigue and abrasion. Its simple 900 F heat treatment also cuts production costs.



Armco PH 15-7 Mo combines high strength at elevated temperatures with excellent corrosion resistance and workability. A leading manufacturer of retaining rings, for example, found this special stainless steel an economical metal with superior properties in severe service. As a result, existing ring applications have been greatly expanded and entirely new fields developed.



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The Business Outlook: Is It Cause For Anxiety?

You need a semantics expert these days to know where you are business-wise. To some people a decline means a depression. To others it means a recession. And to still others it means the direction has changed temporarily.

Your semantics man will tell you also that certain words either step up the blood pressure or they excite the emotions due to recall of long-past experiences. Thus, if you read that the steel tempo is down, it may affect your appetite—especially if your business is steel, depends on steel, or if you have a raft of steel stocks.

Or it may be that capital goods sales are not going the way earlier estimates predicted. That brings to mind past experiences, generates unconscious fears, and, in some cases, directly affects current judgments—or decisions.

Maybe you read that auto sales are disappointing (to whom?). If you are a steel man you become worried. Why not, with autos taking 20 pct of the steel? If you are a tire man, a glass man, an aluminum man, a plastics man, or an oil man, you are definitely affected by what autos do—or don't do.

When you read that Administration economists go out of their way to say things are going dandy, you get suspicious. You know that prosperity—or the lack of it—is the greatest single President maker—or breaker.

If the stock market keeps dropping day after day, you get cold feet, especially if your stocks are on the skids. Talk about technical correction may be correct. But the choice of words used in the news or in reports often has a far greater impact on you than milder words would have had.

The fact that this year will be a good one and that 1959 was pretty good too falls by the wayside as the guesses on what will happen this September—or December—grow by leaps and bounds. Since there is a special sadistic compartment in us which "enjoys" bad news, the semantics of the situation provides a field-day for headline thinkers, writers—or readers.

In the current outlook there is nothing to warrant undue anxiety. If a little anxiety will cause you to sell harder, work harder and plan better, it isn't bad medicine.

If you have what it takes, you will be able to meet the coming business challenges no matter what words are used to describe them.

Tom Campbell

Editor-in-Chief

METALOGICS*

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Steelmakers Plan Campaign

Watch for increasingly aggressive marketing and promotional efforts by the steel industry. New market and product research projects are getting high priority among steel firms. Cooperative promotional activities are climbing. The "steelmark" campaign is just the beginning. Legal barriers have been a delay, but these are gradually being overcome.

Good Strength at 2200°F

Tensile strengths in excess of 40,000 psi at 2200°F are indicated by preliminary data on CB-7, a new columbium-base alloy just announced by the Union Carbide Metals Co. Tests also indicate that the alloy exhibits a high degree of oxidation resistance. The alloy has been developed for applications in the 2000°F plus range for both sheets and forgings.

More Aluminum Engines

Aluminum engine blocks are reported being die cast on a volume test basis. The test contract calls for 60 engines per month. Results so far are said to be encouraging. A major aluminum producer is going all out to make a real dent in this market.

Automation Feeds Grinders

Automated scheduling handles a mix for a family of related parts. This new development in automation allows a distribution system to feed 10 different parts to 22 bore grinders. Any part can be distributed to any machine, or any number of machines, on demand.

Light Controls Transistor

A cadmium sulfide transistor has been demonstrated in electronic circuits as an oscillator, multivibrator, amplifier and radiation detector. Cadmium sulfide is a compound semiconductor with two kinds of atoms. Elemental semiconductors contain one kind of atom. Electrical properties of the transistor are affected by light or other radiations. Amplification can be controlled by changing color or intensity of light that strikes the unit.

Solves Space-Age Problem

Lord Mfg. Co. recently announced a highly damped structural material to solve a serious aeronautical and space design problem—acoustic fatigue. Uses for the new material will include jets, missiles and sundry electronic units. Laminated sections and panels, with an elastomer bonded between the metal sections, absorb noise and vibration.

Swing into Production

To beat Russia in space, we must leapfrog the usual design to production lead time, missile engineering authorities say. They've proposed use of numerical control, at design intent stages, to enable us to swing into fast production of parts —without a tooling build-up. In case of national emergency, tapes could be telegraphed to plants all over the country and production could begin almost immediately.

Labor Muscles to Grow?

Labor chiefs are flexing their political muscles again. They've set themselves a realistic goal: A new national minimum wage law. Congress will probably go along, although perhaps not as far as unions demand ($1.25 per hour). Labor badly needs some kind of popular victory to offset their last year's defeat over labor reform law.

Gallium Arsenide Is Key

GE research scientists have successfully made tiny, electronic parts, called tunnel diodes, work at frequencies above 4000 megacycles (4 billion cycles). Key to the performance is the use of gallium arsenide. This little known, rarely used semiconductor material acts as the basic element in the electronic device's construction.

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Ceramic Tools

Sir—In your January 14 issue, you mentioned on the "Newsfront" page a new ceramic tool which would compete with carbide tools. I found the article most interesting and would appreciate receiving whatever literature available on the subject, (i.e. name of manufacturer and miscellaneous documentation). —Simone Steimann, Societe D'Electro-Chimie D'Electro-Metallurgie Et Des Acieries Electriques D'Ugine, France.

Sir—Regarding your item entitled "Ceramic Tools Outperform," we would appreciate your putting us in touch with the manufacturer of the ceramic tools discussed.

We find your magazine very valuable for keeping us up to date on developments of this type.—C. H. Bowman, Project Engr., Perfect Circle Corp., Hagerstown, Indiana.

▪ **Contact the Gulton Industries, Inc., Metuchen, N. J.—Ed.**

Scrap Co-Op

Sir—I am interested in the last item in your Market-Planning Digest on page 103 of your February 11 issue concerning a steel scrap cooperative.

Do you have any further information on this that can be divulged at this time, or can you tell me to whom we can address our inquiry? —O. O. Albritton, Vice Pres.-Purchases and Stores, Illinois Central Railroad, Chicago.

▪ **At present, we cannot disclose details of the steel scrap cooperative. But the letter has been forwarded to the people concerned. —Ed.**

Computers

Sir—Your articles are always of interest to the men of our organization in that they are informative and up to date.

However, on page 56 of your February 4 issue, there has been a mis-statement of what we consider one of the most important steps forward in the terms of the application of computer control of on-line processing. The last paragraph says, "No one is exactly sure at the moment what functions computers will handle in steel production. Initially, the machines will be used to a large extent for storing and analyzing data."

We know exactly what functions this computer will perform in handling the complete operation automatically of the hot strip mill.

This control system will not be used for storing or analyzing data, but perform full on-line operation to enable the steel mill to operate at its maximum capacities.

Since this is a giant step forward, and the first in the industry, I feel that it is important that these facts be made clear. I am sure you will agree with me.—C. E. Jones, General Mgr., Daystrom, Inc., Control Systems Div., La Jolla, Calif.

▪ **Early in the story we said the computer will supply supervisory control of mill and furnace adjustments. At the end of the article we speculated on just how and where computers will be used for control of blast furnaces, openhearths, oxygen steelmaking and perhaps ore and cokemaking. We feel this is an area that has not been too well defined yet.—Ed.**

From Japan

Sir—We read with great interest an article entitled "Set-up Pre-Refines Molten Iron For Use in Electric Furnace," in the January 21 issue of your magazine. Would you kindly send us two reprints of this article? — K. Isomura, Technical Representative, Fuji Iron & Steel Co., Ltd., New York.

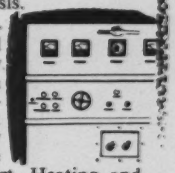
▪ **Reprints are on the way.—Ed.**

MARIAN A. STACHOWIAK,
Hayes Induction Heating Engineer, reports . . .

SELECTIVE HEAT TREATING CAN BE SIMPLE...

when equipment and application know-how go to work

High-Frequency Induction Heating . . . standard procedure for selective hardening, melting, annealing, brazing, preheating, hot forming, sintering, and vacuum heating . . . now takes a big step forward with another Hayes development — a new high-frequency induction unit that puts selective heating on a *simple* and *economical* basis.



PUSH-BUTTON Controls are featured with this new Hayes induction heater to obtain instant and exact heat distribution at any desired surface area of a steel part. Heating and quenching cycles are *automatically controlled* and are so rapid that distortion, decarburization, and excessive oxidation are practically eliminated. Protective atmosphere systems (pioneered by Hayes) can be supplied as an integral part of the induction unit.

UNIT Design Saves Space — because heater stations and power generator are incorporated in *one* compact cubicle...for more output per sq. ft. of floor space. Moreover, the Hayes unit includes work handling devices which can be set up simply, integrated into your production line, and operated as easily as any other machine tool.

Safe, Easy Maintenance is another feature of Hayes' design. Easy-access panels provide plenty of working room for maintenance and adjustment of components. Safety interlock switches throughout shut off plate power when panels are opened. Write for information on Hayes new induction heating unit, work tables and accessories . . . or other "Results Guaranteed" furnaces in Hayes Certain Curtain line.

FREE BULLETIN 5910

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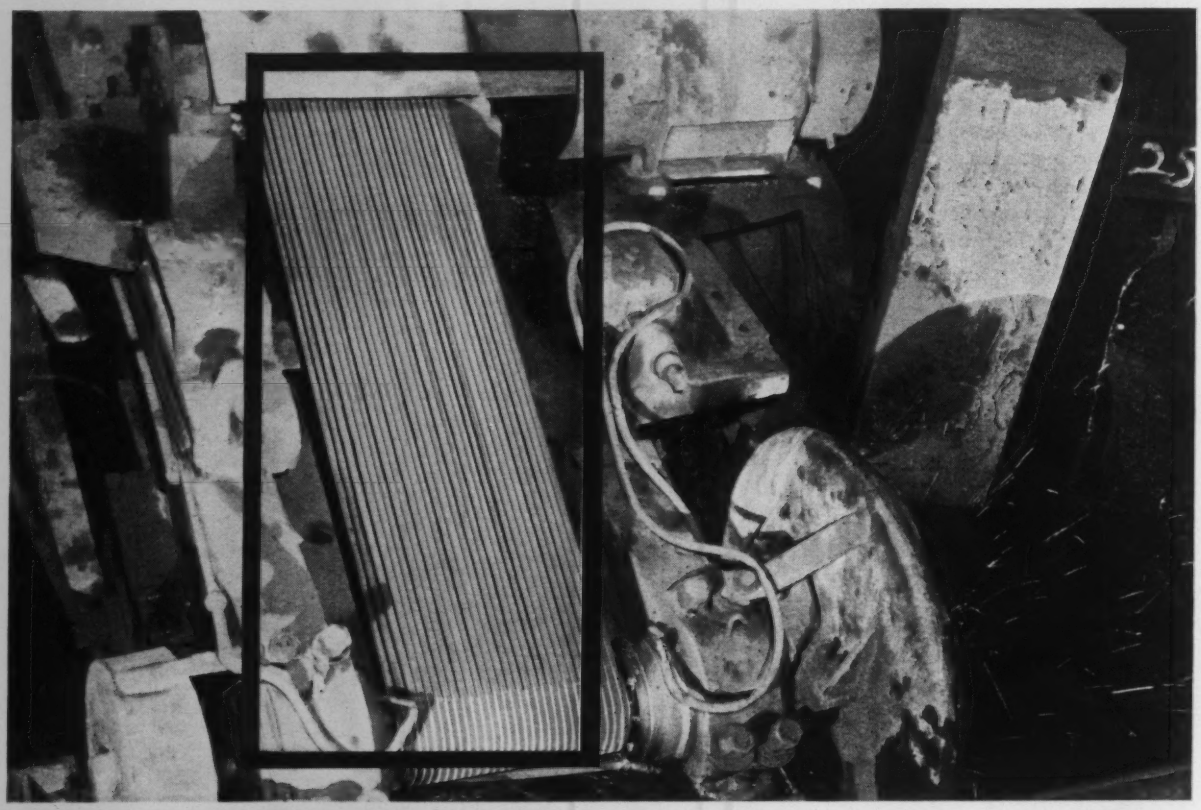
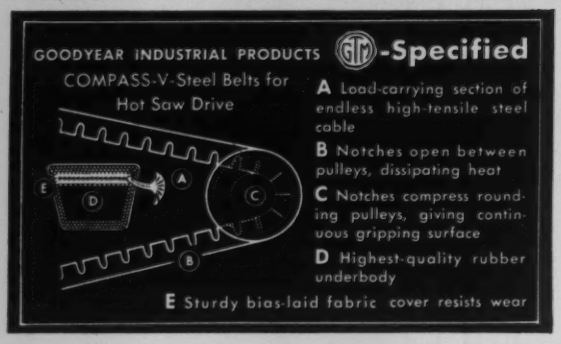
It Pays To See Hayes for metallurgical guidance, lab. facilities, furnaces, atmos. generators, gas and liquid dryers.

Chewing through a steady diet of red-hot, 8-inch steel bars proved too much for the biggest saw at this Western mill. It looked like the V-belt drive would have to be upped by at least 100 h.p. —with costly new sheaves installed to handle the extra load. But the G.T.M.—Goodyear Technical Man—made a suggestion: COMPASS-V-Steel Belts. Today, a matched set of only 28 of his high-capacity belts handle a job that normally calls for 42 belts. Yet there's been no sacrifice in belt-life—no costly sheave replacement. Result: the mill owners saved $500 when they re-powered the saw—will continue to save every time belts are changed.

Compass—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio




GOODYEAR INDUSTRIAL PRODUCTS GTM-Specified
COMPASS-V-Steel Belts for Hot Saw Drive
A Load-carrying section of endless high-tensile steel cable
B Notches open between pulleys, dissipating heat
C Notches compress rounding pulleys, giving continuous gripping surface
D Highest-quality rubber underbody
E Sturdy bias-laid fabric cover resists wear

Grueling service requirements like this are just routine to the G.T.M. Invariably, he has tips — and industrial rubber products — for improving production.

You can always reach him quickly and easily, too. Just contact your Goodyear Distributor—also the man to see for V-Belts, Hose, Flat Belts and other industrial items. He's under "Rubber Goods" or "Rubber Products" in the Yellow Pages. Or write Goodyear, Industrial Products Division, Lincoln 2, Nebraska, or Akron 16, Ohio.

THE BIG NAME IN V-BELTS IS

GOODYEAR

THE GREATEST NAME IN RUBBER

Metalworking Dollar

With more and more emphasis on automatic machining operations and higher cutting speeds, what happens at the point of a cutting tool becomes just that much more important. No matter how expensive a machine may be, the pay-off in production and quality centers in that one small area around the tool point.

So, it's with good reason that The IRON AGE has selected Cutting Oils and Coolants as the subject for next week's special feature in the series "How to Get More for Your Metalworking Dollar."

Cutting Oil "Dollar"—When it comes to selecting the proper cutting oil or collant, for example, no one type is best for all jobs. Selection becomes even more complex as the list of machinable metals and alloys grows longer; as new cutting tool materials become available; and as machining speeds keep climbing.

What, then, should you expect from the cutting oil or coolant? Which type do you use for each specific job? Do you use it "straight" or do you "cut" it? What flow do you need?

These are only a few of the many problems that face practical shop people. This article in the prize-winning series contains sound factual information for production men, operating management, purchasing agents, supervisors and others. In short, it will help you get more mileage from every drop of cutting oil or coolant at the lowest cost.

From the First—Since the first article in the series appeared ("Steel Dollar," Oct., 1955), The IRON AGE has been deluged with thousands of requests for article reprints. They have been used for innumerable purposes in all phases of metalworking.

Export-Import

Julius Mueller, a leading exporter of machine tools to the Orient, turned his tables recently.

Mr. Mueller imported something from the Orient. Although a little out of the machine tool class, the import was well received. At the Hunter College Playhouse, New York, Mr. Mueller sponsored and underwrote the first appearance of the Japanese opera, "Yu-Zuru." Translated it means "The Twilight Heron."

ON STAGE: The cast of the opera "Yu-Zuru" performs on the Hunter College Playhouse stage. The production was imported, sponsored and underwritten by machine tool exporter Julius Mueller. Proceeds established a new music scholarship.

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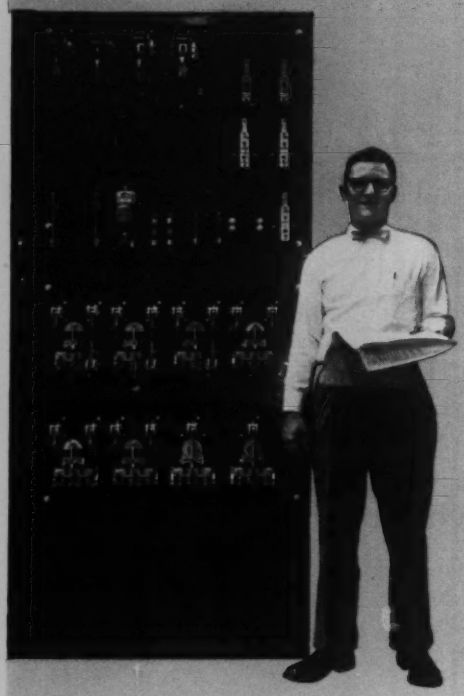

R. M. Bosshardt, Manager,
Heavy Duty Metal Rolling Section,
Reliance Electric & Engineering Co.

"The terms 'precision' and 'versatility', as applied by the makers of this new 'Pittsburgh' 4/high-2/high combination cold mill, also exactly describe the Reliance mill-type heavy industry control. Smooth functioning and easily maintained, this control is slate mounted for safety and quick accessibility.

"The mill itself in 4/high is used for cold reducing; in 2/high, it tempers and finishes. A 250 hp. Reliance D-c. mill motor is coupled to a gear reducer which drives 2 output shafts which can be applied to either set of rolls depending on the operation. Utilization of full motor speed range produces a maximum of 300 feet per minute on 8" or 20" rolls. The reel is driven by a 100 hp. D-c. motor with two VSR regulators: one to match speed of the mill, the other to maintain tension. Reel is automatically changed . . . and an all-electric control quickly recalibrates reel drive system for either 2/high or 4/high."

The result is two-fold: extreme product accuracy . . . smooth economical operation. Reliance Sales Engineers can quickly apply their talents and products to your manufacturing system needs. Call your Reliance office, or write us direct for complete product and application information. L-1650

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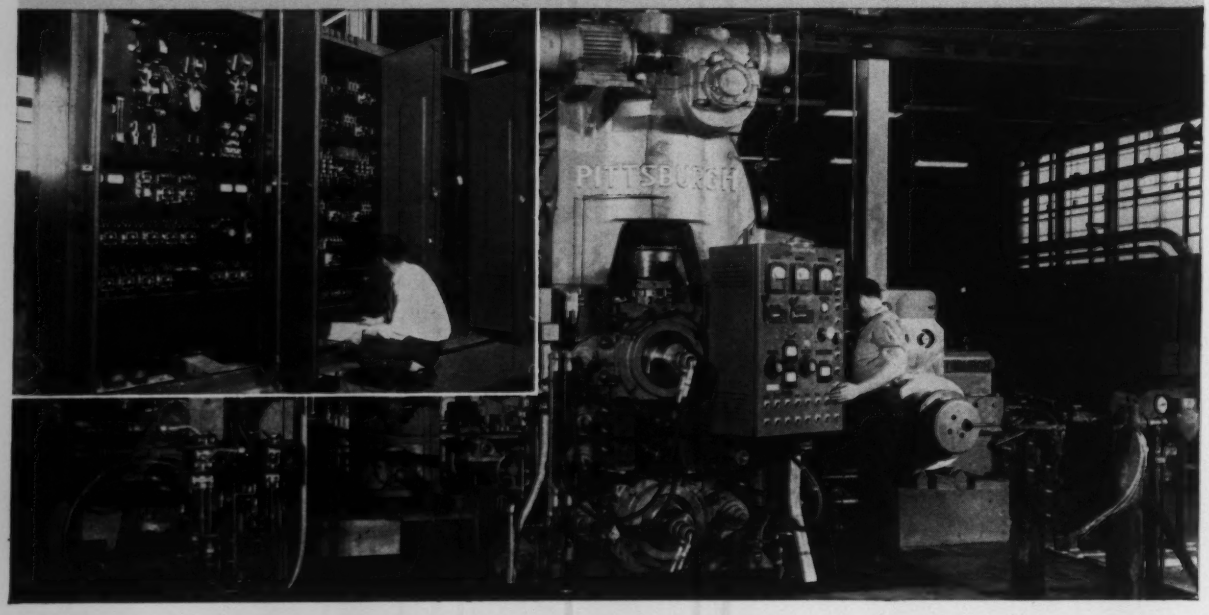
Duty Master A-c. Motors, Master Gearmotors, Reeves Drives, V★S Drives, Super 'T' D-c. Motors, Generators, Controls and Engineered Drive Systems.



COMING EXHIBITS

Corrosion Show — March 14-18, Memorial Auditorium, Dallas. (National Assn. of Corrosion Engineers, 1061 M & M Bldg., Houston)

Tool Show—April 21-28, Detroit Artillery Armory, Detroit. (American Society of Tool Engineers, 10700 Puritan, Detroit 38.)

Welding Show—April 25-29, Great Western Exhibit Center, Los Angeles. (American Welding Society, Inc., 33 West 39th St., New York 18.)

1960 Castings Congress & Exposition—May 9-13, Convention Hall, Philadelphia (American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.)

Southwestern Metal Show — May 9-13, State Fair Park, Automobile Bldg., Dallas, Texas. (American Society for Metals, Metals Park, Novelty, O.)

Design Engineering Show — May 23-26, Coliseum, New York. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Production Engineering Show—Sept. 6-16, Navy Pier, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Machine Tool Exposition—Sept. 6-16, International Amphitheatre, Chicago. (National Machine Tool Builders Assn., 2139 Wisconsin Ave., Washington 7, D. C.)

Iron & Steel Show—Sept. 27-30, Cleveland Public Auditorium, Cleveland, O. (Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22.)

MEETINGS

MARCH

Hoist Manufacturers Assn. — Annual meeting, Mar. 1, Hotel Cleveland, Cleveland. Association head-

(Continued on P. 18)

Instant bankruptcy! In a flash, fire can put you out of business. Protect dangerous flammable liquid hazards (like the coater shown above) with a *fully-automatic* Kidde carbon dioxide extinguishing system. Approved by U.L. and F.M., Kidde systems smother fire in seconds, leave no mess, turn off power and sound an alarm . . . get you back in production fast! Kidde's 35 years' experience can help you protect *any* hazard . . . write today and find out how.

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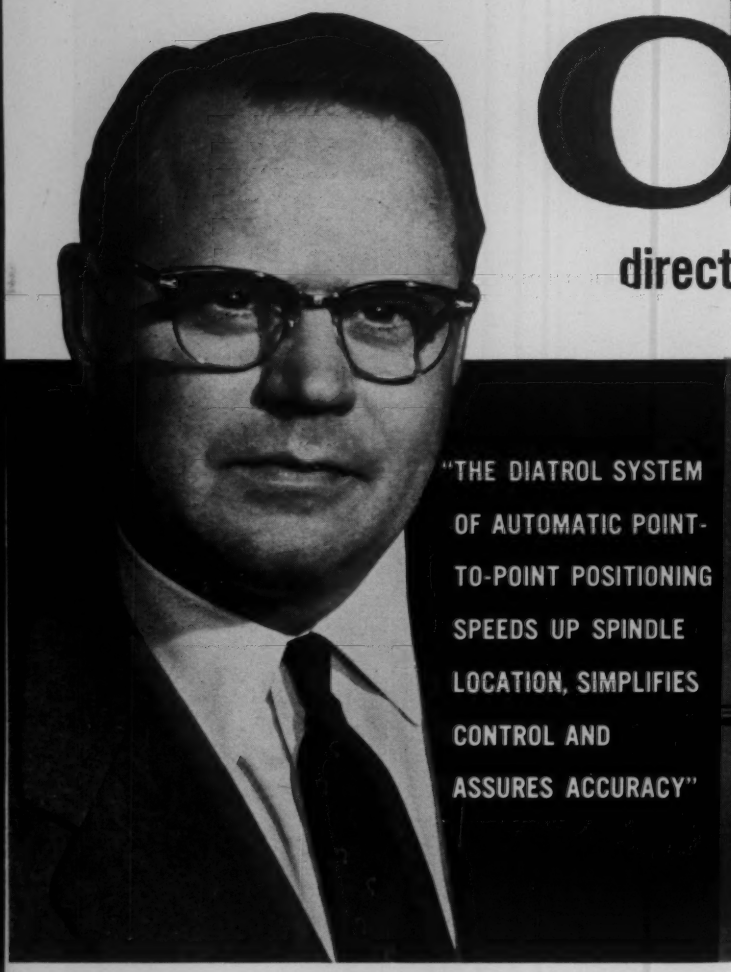
direct dial dimensioning system



"THE DIATROL SYSTEM OF AUTOMATIC POINT-TO-POINT POSITIONING SPEEDS UP SPINDLE LOCATION, SIMPLIFIES CONTROL AND ASSURES ACCURACY"

"Simply dial in the pre-selected coordinate dimensions, touch a button, the rest is automatic. The JIGMIL table and spindle head automatically position at the desired hole location in seconds. While the JIGMIL is machining, you can *pre-set* your next move. Developed by our own engineers, Diatrol adds to the inherent versatility and accuracy of the JIGMIL, further reducing human error as well as set-up and machine time. *Diatrol makes it possible to machine custom or small lot jobs at production rates.*"

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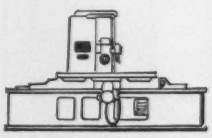

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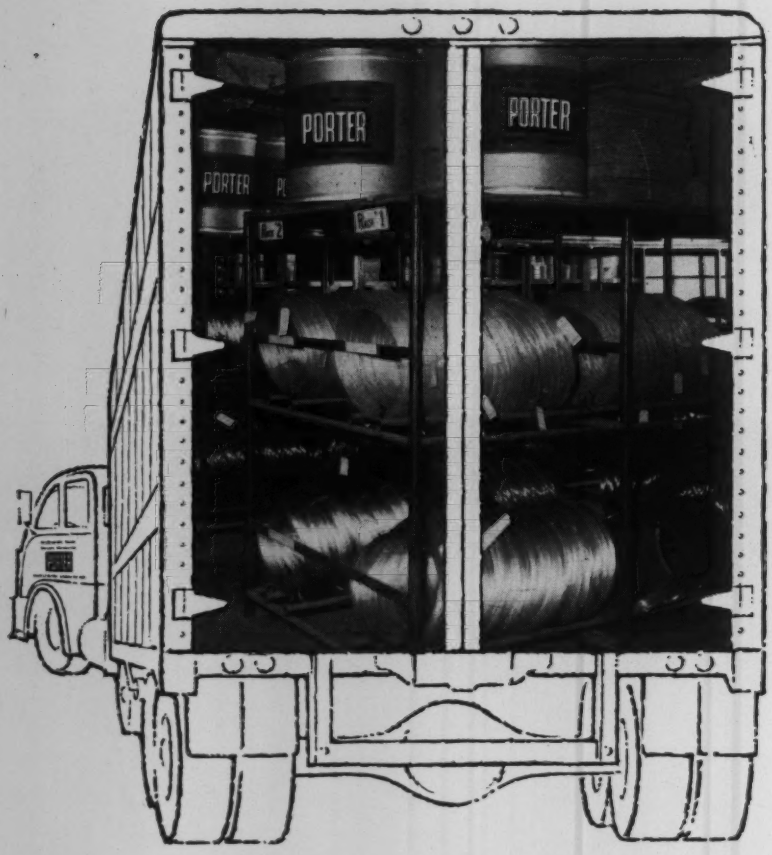
ACCURATE HOLES AND FLAT SURFACES IN PRECISE LOCATIONS



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These coils of stainless steel wire are waiting to be shipped out at a moment's notice from our stainless-specialty plant.

Wire *precision-drawn* from Inco alloys is our specialty. Getting it out to you on time is our pride. Coming back for more—and more—is a wonderful habit of our customers.

If your design calls for wire in Monel*, Inconel*, or stainless alloys—try the products and service of our Alloy Works. For full information, write or call *Riverside-Alloy Metal Division, H. K. Porter Company, Inc., Riverside, N. J.*

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PORTER SERVES INDUSTRY: with Rubber and Friction Products—THERMOID DIVISION; Electrical Equipment—DELTA-STAR ELECTRIC DIVISION, NATIONAL ELECTRIC DIVISION, PEERLESS ELECTRIC DIVISION; Specialty Alloys—RIVERSIDE-ALLOY METAL DIVISION; Refractories—REFRACTORIES DIVISION; Electric Furnace Steel—CONNORS STEEL DIVISION, VULCAN-KIDD STEEL DIVISION; Fabricated Products—DISSTON DIVISION, FORGE AND FITTINGS DIVISION, LESCHEN WIRE ROPE DIVISION, MOULDINGS DIVISION, H. K. PORTER COMPANY de MEXICO, S. A.; and in Canada, Refractories, "Disston" Tools, "Federal" Wires and Cables, "Nepcoduct" Systems—H. K. PORTER COMPANY (CANADA) LTD.

MEETINGS

(Continued from P. 15)

quarters, One Thomas Circle, Washington, D. C.

Can Manufacturers Institute, Inc.—Annual meeting, March 7, Waldorf-Astoria Hotel, New York. Institute headquarters, 821—15th St., N. W., Washington 5, D. C.

Assn. of Iron & Steel Engineers—Western meeting, March 7-9, St. Francis Hotel, San Francisco. Association headquarters, 1010 Empire Bldg., Pittsburgh.

Manufacturers Standardization Society of the Valve & Fittings Industry — Annual meeting, March 8-10, The Barbizon-Plaza Hotel, New York. Society headquarters, 420 Lexington Ave., New York.

Aluminum Extruders Council—Quarterly meeting, Mar. 9-11, Arawak Hotel, Jamaica, W. I. Council headquarters, 1015 Chestnut St., Philadelphia.

National Assn. of Waste Material Dealers, Inc.—Annual convention, March 12-15, Waldorf - Astoria Hotel, New York. Association headquarters, 271 Madison Ave., New York 16, N. Y.

Fire Equipment Mfrs. Assn.—Annual meeting, March 15-16, Barbizon-Plaza Hotel, New York. Association headquarters, 759 One Gateway Center, Pittsburgh.

Society for Non-Destructive Testing—Third international conference, March 15-21, Tokyo, Japan. Society headquarters, 1109 Hinman St., Evanston, Ill.

Electronic Industries Assn.—Spring conference, March 16-18, Statler Hilton Hotel, Washington. Association headquarters, 1721 DeSales St., N. W., Washington.

Scale Mfrs. Assn., Inc. — Spring meeting, March 22-23, Washington. Association headquarters, One Thomas Circle, Washington.

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SIZE and CAPACITY

for drawing largest wire sizes CONTINUOUSLY *without preliminary breakdown*

This is the big boy! Here is capacity in plenty to meet the ever-increasing demand for prestressed concrete wire and bridge wire at high production rates. The Vaughn HRX MOTOBLOX does a *double-cooled* (air *and* water) job of continuous operation on large wire sizes without preliminary breakdown—for instance, it will finish .70 carbon .192" diameter wire from .437" diameter rod at 1000 fpm. Equipped with 30" intermediate blocks and 36" finishing block, the Vaughn HRX can be obtained in packaged or conventional design. ● Let us give you the profit-making details!

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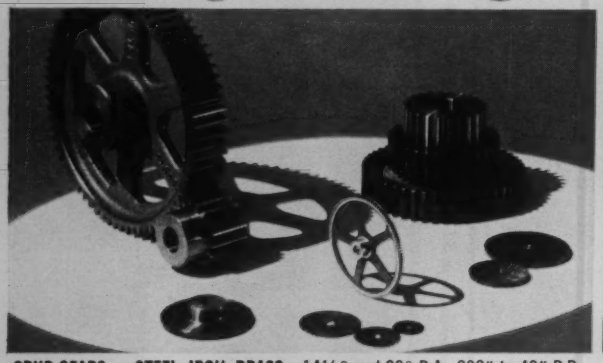
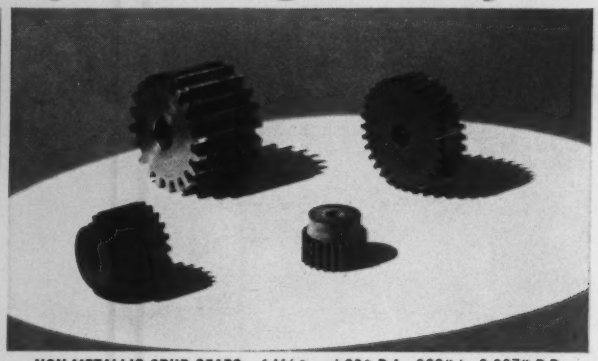
COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

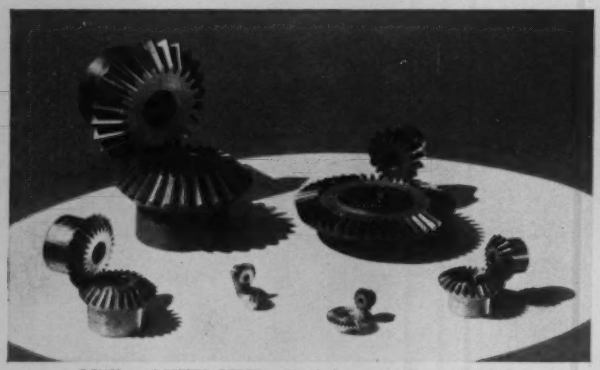
Design around gears you can get today



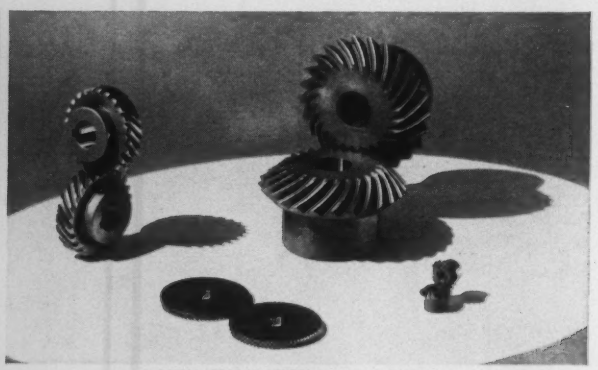
SPUR GEARS — STEEL, IRON, BRASS 14½° and 20° P.A. .208" to 40" P.D.



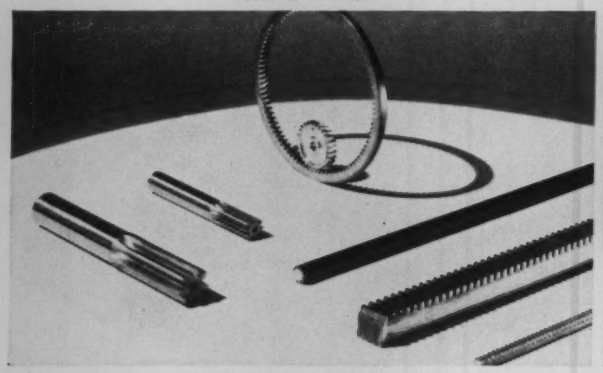
NON-METALLIC SPUR GEARS 14½° and 20° P.A. .938" to 6.667" P.D.



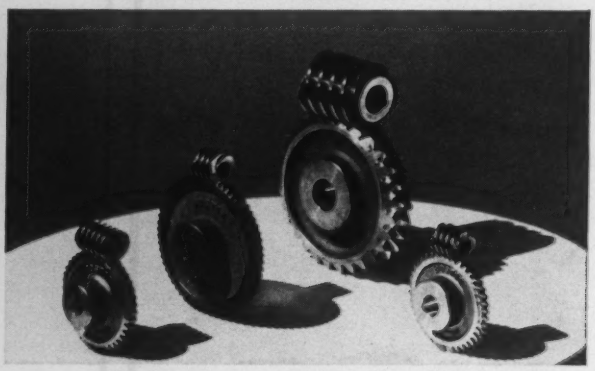
BEVEL and MITER GEARS Steel, Iron, and Brass 20° P.A. .312" to 14" P.D.



STEEL SPIRAL MITERS 1" to 5" P.D.
HELICAL GEARS Steel and Bronze .333" to 6" P.D.



RACK • PINION WIRE Steel and Brass 14½° and 20° P.A.
PINIONS • INTERNAL GEARS



WORM GEARS Bronze and Iron .417" to 18" P.D.
WORMS .333" to 4" P.D. Soft steel and hardened and ground steel

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Design around standardized BOSTON Gears FROM STOCK is the quickest (and lower-cost) way to get your project "off the board" and in production — whether it's a prototype, a product for resale, or new equipment for your own plant. Catalog No. 57 lists over 2000 gears.

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— STANDARDIZATION PAYS —

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FASTENER MAKERS ARE ON THE MOVE to cut production costs and improve their products. Result is a strong boom in purchases of new fastener-making equipment. Expenditures for new machinery by the industry may hit $50 million this year.

WHERE ARE THE COMPACT CARS finding their buyers? It's at the expense of sales of the conventional Chevrolets, Fords and Plymouths more than any other part of the market. This group took only 46 pct of U.S.-built new car sales in January compared with 61 pct in January a year ago.

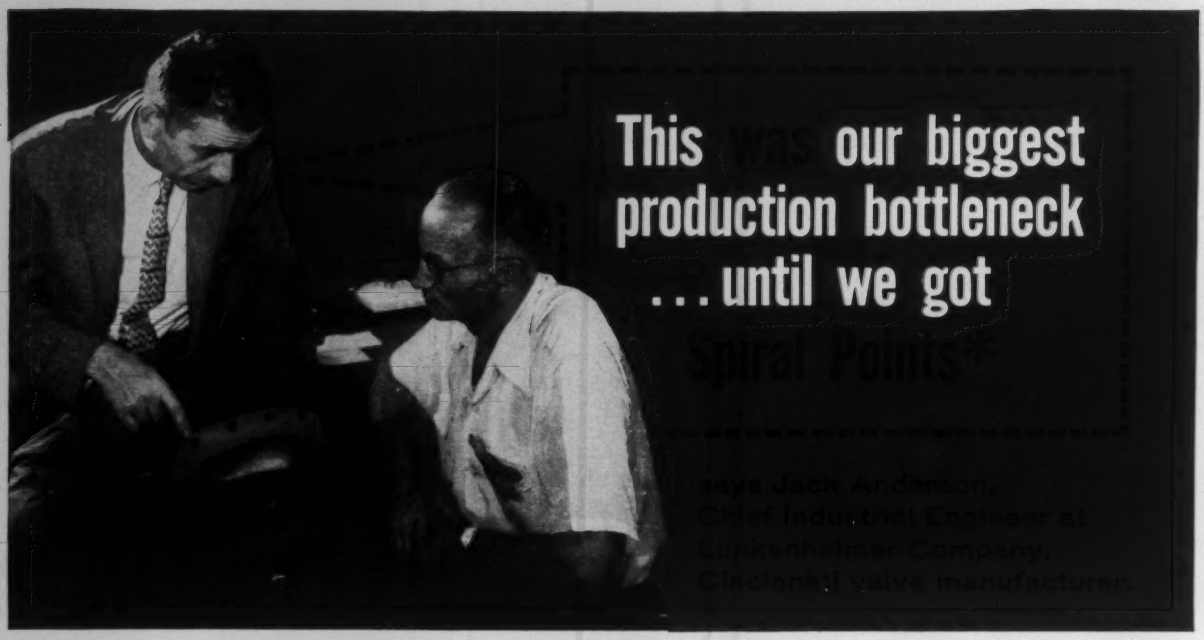
FOUNDRIES MAY BE CUTTING BACK on their purchases of new equipment. The index of foundry equipment sales for December, 1959 dropped to 95.9 (1947-47=100) compared with 131.1 in November and substantially higher figures all during 1959. The index, published by the Foundry Equipment Manufacturers Assn., hit 237 last February.

FEBRUARY AUTO PRODUCTION IS NOW EXPECTED to run about 650,000 cars. Earlier, estimates had gone as high as 725,000. But don't let the revision get out of perspective. Sales are still running 16 pct over the February, 1959 rate and 12 pct ahead of last year for the year to date.

EQUIPMENT ORDERING BY THE RAILROADS continues to look good. New car orders in January hit 7149. This better than respectable figure comes on top of 10,560 new car orders in December. As a result, the backlog of cars on order totals 43,870 compared with 29,470 a year ago.

IS NEW ENGLAND A BETTER-THAN-NATIONAL average market? Fred Maytag II, president of the appliance company, says total retail sales per household have jumped 16.4 pct in the past five years. This compares with the national average of 9.8 pct. And he backs it up with a record of improved sales by his company in the area.

SOME CURRENT FEELING OF BEARISHNESS is not indicated in latest government figures. The January summary of business conditions, issued by the Federal Reserve Board, reports a record index of industrial production, (169 pct of the 1947-49 average). This record production is supported by higher incomes and higher retail sales during the month.



This was our biggest production bottleneck ... until we got Spiral Points*

says Jack Anderson, Chief Industrial Engineer at Lunkenheimer Company, Cincinnati valve manufacturer.

"Just two of these holes are critical—all other machining operations are located from them. But it used to cost us plenty to get them right — frequent drill resharpening, slower feeds, touching up the holes, even special locating pins and eccentric guide bushings.

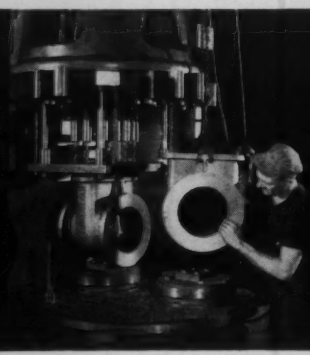
"It sounds like a miracle, but our spiral point drills broke this production bottleneck completely! They maintained consistent hole size, well within our plus .005″ minus .004″ tolerance. They don't walk, so guide bushing wear has been practically eliminated. And, where we used to get 225 to 250 parts per drill grind, we now average 2000 or better.

"In short, they drill holes where we want them, to the size we want them . . . in one pass. Now production stays on schedule . . . scrap is negligible."

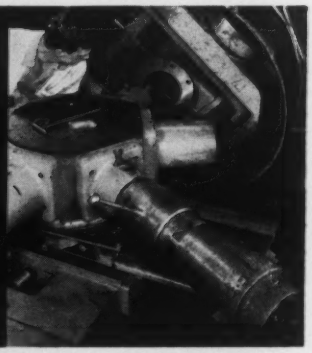
**Spiral point is Cincinnati's new drill point geometry which transforms a standard twist drill into a cost-reducing, precision tool. Cincinnati's SPIROPOINT® DRILL SHARPENER automatically applies this new point geometry in a matter of seconds.*

ASK YOUR CINCINNATI LATHE AND TOOL CO. DEALER, OR WRITE TO US DIRECT.

SPIRAL POINTS HERE...
Drilling mounting holes in the flange of a cast iron gate valve. The self-centering action of spiral point geometry maintains hole-positioning accuracy without excessive wear on guide bushings—produces round, on-size holes.



MEANS ACCURACY HERE
(at lower cost)
Machining and threading seat ring groove in gate valve body. All internal machining is performed with the valve body held in work fixtures which accurately locate from two spiral point drilled holes.

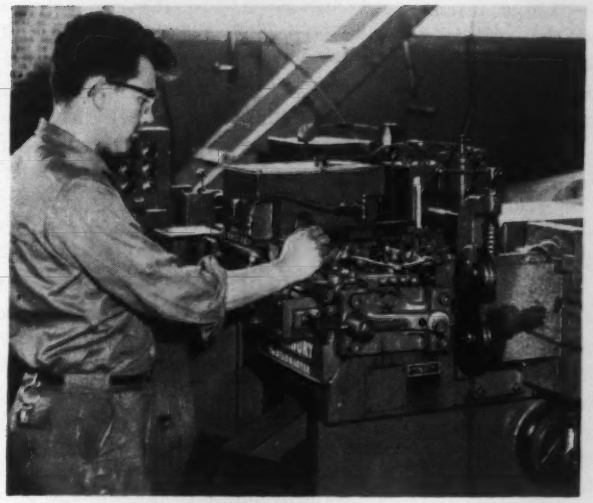


Improved Machining Through Research

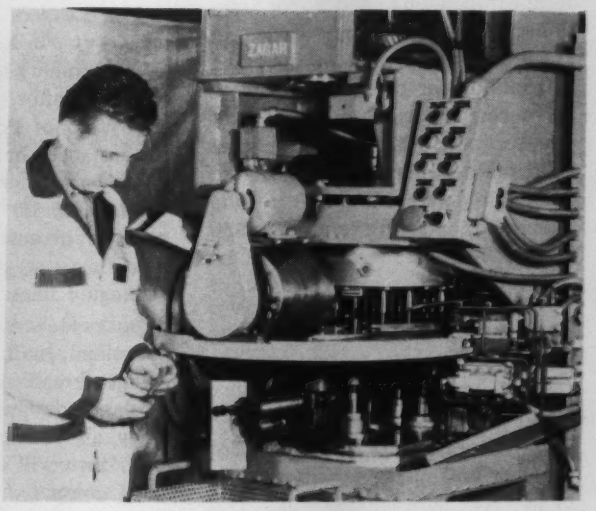
CINCINNATI LATHE AND TOOL CO.

3207 Disney Street • Cincinnati 9, Ohio

"TRAY-TOP" Lathes / "CINCINNATI" Drilling Machines / "SPIROPOINT" Drill Sharpeners



TAPPER: This high speed Zager nut tapper is typical of new equipment installed by fastener makers. It taps 49 nuts at a time, 50,000 to 70,000 per hour.



FAST BLANKS: Waterbury Farrel solid die double stroke headmaster makes fastener blanks in shank length at speeds of 200 to 350 blanks per minute.

Fastener Makers Tool Up For Higher Speed, Lower Costs

Business is good, and most fastener makers are in the market for streamlined equipment.

A primary objective: To compete with lower priced imports. —By T. M. Rohan.

▪ Fastener makers are building up to a man-sized spree on new equipment for their plants.

Business has seldom been better than it is now. Many fastener firms will probably put a good part of the profits into high-speed machinery to keep production costs within hailing distance of the flood of low priced imports.

Machinery builders verify the trend, are bringing out tempting new machines.

Behind the Trend—The trend in the fastener industry has many aspects. For one, the push for newer, faster equipment is strongest among medium and smaller firms which traditionally follow the larger firms. Big ones have already put in many new machines and proved they will work. Now job operations are ready to make their move.

The influence of imports is strong. Fastener firms were among the first to feel the blow years ago. Some markets, like nails and wood screws, have been lost beyond recapture.

New Equipment — The production step-ups extend through high-speed heading machines, thread rollers, slotters, tappers, cold punchers and into better inplant handling, lubricants, heat treating and plating facilities. The boltmaker, for instance, which turns out a completed bolt from wire strand is as much an improvement in materials handling and space saving as in cold forging.

In a parallel advance, fastener firms are branching into new areas of parts making and allied fields using progressive header-type machines (Iron Age, July 30, '59 Pg. 76). Engineering staffs of fastener firms have doubled in the last five years, principally tool designers who squeeze the most out of the new progressive headers.

A Saving—Millions of spark plug bodies are being extruded this way with minimum scrap loss, rather than machined from bar stock. Mills have had to put in new annealing furnaces to handle the surge in demand for soft, spheroid, annealed wire and rod.

New machinery for fastener making has shown a good increase re-

cently, and this year will probably go up still more. In 1947 spending for "plant and equipment" hit $18.2 million, including $13.5 for machinery and equipment alone. In 1954 it hit $26 million, including $20 million for machinery. And in the recession year of 1958, last year for which Dept. of Commerce figures are available, it soared to $45 million total. There is a good possibility spending will hit $50 million this year.

Business Is Good—National Machinery Co., Tiffin, O., a leading machinery maker, is on overtime and has had a surge in orders since final settlement of the steel strike.

"Our orders for higher speed fastener and parts making equipment are substantially increased over the past few months so that our backlog is much healthier now than a year ago," says Tom Downey, sales manager. "We believe this is the result of the general upturn in business activity, the settlement of the steel situation and the desire to remain competitive on a low cost per unit basis."

Waterbury Farrel Foundry and Machine Div., of Textron, Inc., at Waterbury, Conn., also a major machinery builder, has had an increase in backlog of orders for the fastener industry too.

The Leaders — Large fastener makers have lead the parade to new machinery mostly because they can better afford it. Russell Burdsall and Ward of Port Chester, N. Y., for instance, has spent $2 million annually for new equipment since World War II. This year they are putting in new boltmakers, heat treat furnaces, plating facilities and packaging lines.

National Screw & Machine Co., Cleveland, built its own high speed rotary thread roller, from a New Zealand design, and licensed it. They also have rotary thread rollers which will operate at 2000 per min. compared to about 130 on a reciprocating flat-die type.

Lamson and Sessions in Cleveland has a big new plant with as much wire annealing capacity as some small steel mills. Such huge quantities of punch-type tools are used up that L and S has an automatic screw machine to make them.

Up 20 Pct—Ferry Cap and Set Screw Co. of Cleveland expects a 20 pct gain this year over 1959, one of its best years. It will spend more for machinery this year than last.

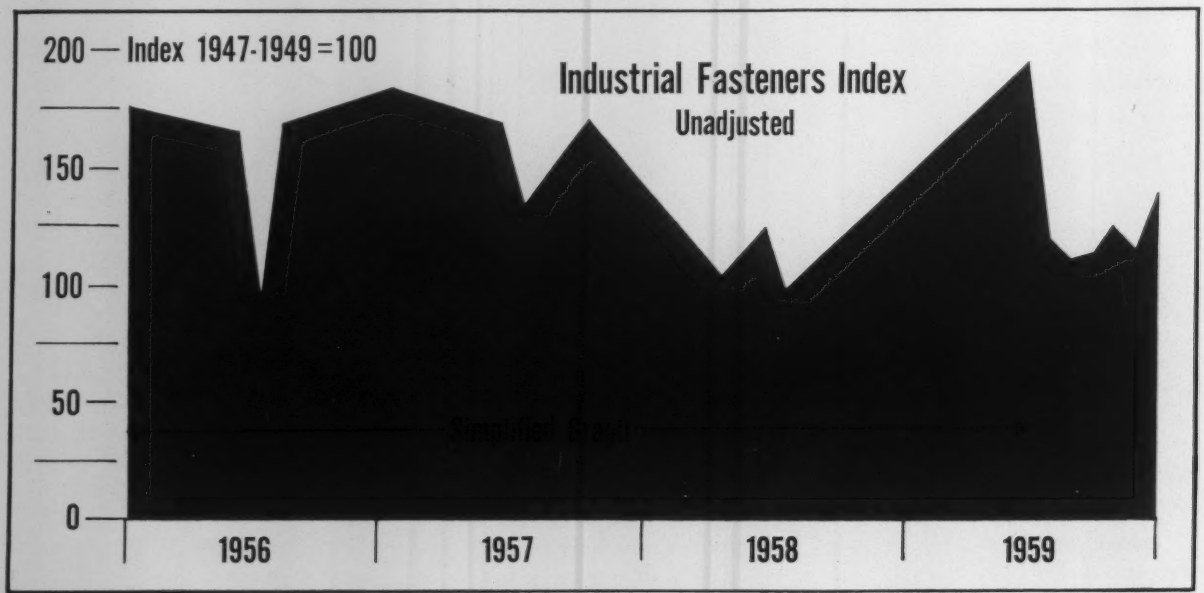
Some of the new high-speed machines being developed would tempt many a plant manager to go into hock for them.

A nut tapper built by Zagar, Inc., Cleveland, will tap them at 8 to 10 times conventional speeds, and at comparable space savings. Four units have been sold, says Fred Nevar, assistant sales manager, 10 more are on order and the firm expects to sell 50 in the next few years. The unit will do 70,000 per hour under ideal conditions and sells for $20,000 to $25,000. Eventually new models will have possible production rate of 100,000 parts per hour.

The Boltmaker—One of the biggest developments in years in the fastener industry has been the boltmaker. These take in wire on one end and turn out completed bolts at the other. National originally hoped to sell a dozen or so at upwards of $200,000 each when it was introduced some years ago. Over 100 have been sold.

Other new high-speed machines going well are the National single die double blow heading unit for

Fastener Shipments Are on the Upturn



making small screws to 5/16 in. A new Waterbury Farrel solid die double-stroke heater goes 450 per min. on a ⅛ in. size. It succeeded a toggle-type header which went 150 per min.

Big Seller — Another new approach going well is a high-speed, 60-ton Minster hydraulic press used to cold punch keps type nuts from flat wire at 400 per min. at Eaton's Reliance Div. in Massillon, O.

One of the knottiest problems for years has been making nut blanks with minimum scrap loss. The Minster press, a new approach, gets a 60 pct yield.

For the Long Run—Medium and smaller fastener makers have been experimenting with high-speed machines for long production runs. Eaton Manufacturing Co.'s Massillon, O., plant has had a typical experience.

"We put in a new Waterbury Farrel No. 10 rotary die threader that is turning out 450 pieces per min. and is capable of 600," says Jack Munsey, manufacturing engineering manager. "Our conventional flat die reciprocating types will make about 120 but are more versatile. This rotary is a prototype to get experience. If we can assemble the volume and develop an assembly unit for washer types, we can put in 7 of these units and throw out 25 old flat-die units."

Another Cleveland fastener plant manager says: "We have put in some of the new high speed rotary thread rollers for standard items because that is where we compete with imports. We will probably be puting in more soon."

Eaton Manufacturing's Reliance Div. general manager Paul A. Miller says: "It is difficult to exactly pinpoint the ultimate production of new and improved fastener making machines. However, if each of the latest machines does turn out four times as much production as one of the older ones, we're going to look over our investment more closely."

Will Anti-Merger Action Spread?

Government appears determined to fight metals producers' moving into areas of fabrication.—By G. J. McManus.

▪ The stiffening government attitude on mergers and acquisitions is a cause of growing concern among basic metals producers.

What lawyers and executives are concerned about is the potential of recent moves by the Justice Dept. and Federal Trade Commission.

How Far?—If the government can make its complaints stick, where does the crowding action stop? Can the basic producers be forced out of lines like structural fabrication, drum manufacture, culvert making and a raft of others?

According to a top steel official, these questions are getting serious study in company legal offices. There have been no open attacks on established forms of integration, but the government "has been doing some active fishing."

Recent Actions—The tough attitude was underscored two weeks ago. At that time Federal Trade Commission ordered Reynolds Metals Co. to sell a West Coast subsidiary that makes foil products. FTC argued Reynolds had caused a shift of power in a relatively small industry.

Last week the Justice Dept. moved to block the acquisition of a building products fabricator by National Steel Corp. Acting assistant attorney general R. A. Bicks said one purpose of the action was to "check in its incipiency any trend on the part of integrated steel producers to take over a comparatively young and growing industry which to date has been in large measure in the control of independent manufacturers."

Hits Aluminum Too—This line of attack clashes head-on with marketing plans of the aluminum industry. Alcoa, for one, is determined to expand its fabricating activities, particularly in the building field.

Alcoa says it will continue its fabrication program. National Steel and Reynolds Metals plan to fight the government restraining actions. Lawyers say there are solid grounds for challenge.

Sweeping Interpretation—Nevertheless, legal men are worried about the immediate and ultimate implications of the government stand. The language of the 1950 Anti-Trust Act is broad to start with. Section 7 of the act forbids any union that would have the effect of lessening competition in any line of commerce or tend to create a monopoly.

When this language was put to its first big test in the Bethlehem-Youngstown case, Federal Judge Edward Weinfeld gave a sweeping opinion as to its meaning.

How Restrictive?—If it is applied to the fullest extent, a steel mill could conceivably be restricted to the production of basic steel. There is no indication the government is seeking such a drastic application. And there is no way of knowing if restraints will be upheld.

Lawyers say the meaning of the anti-trust act will have to be hammered out by court actions. Meanwhile, metals producers have no way of knowing how far they can legally go in fabrication. Only one thing has been made clear: The government intends to fight any major moves toward integrated fabrication.

It may be legislative action will be needed to clarify and limit the present act, some lawyers believe.

New Warehouse Prices in Effect

With the new service center pricing system, small buyers will get a better price break.

New prices offer savings in smaller item quantity brackets. —By K. W. Bennett.

■ What do the new steel service center prices mean to the buyer? A sales vice president for a service center chain put it this way: "The new extra charges simply mean that the buyer of small items gets a break like the buyer of large orders got a year ago."

To relate service center steel prices to actual handling costs, the warehouse industry last year offered reductions in handling extras for buyers who consolidated their orders. (IRON AGE, May 28, 1959, P. 69). This year, the buyer of small item quantities is getting a similar break.

Schedules in Effect—Price schedules already in effect at service centers in Pittsburgh, Cleveland, and St. Paul are expected to blanket these areas. Changes, though not affecting as much of the extra list, have already been instituted at Dallas, Houston, and Buffalo.

The new extra charges for order quantity and item quantity offer substantial savings in the smaller item quantity brackets, from under 100 lb to 999 lb. It is still necessary to lump these small item quantities into a fairly large order quantity to get top benefits. Order quantities of 5000-20,000 lb show the greatest economies. For instance: Items of 999 lb or less, when purchased in a 5000 lb total order, will show savings of $.25 per cwt to as much as $3 per cwt, below previous extra price levels.

Some Unchanged—Of 34 item quantity and order quantity charges, 11 remain unchanged. Order quantities of 5000-20,000 lb with item quantities of 1000-10,000 lb and over, are largely unaffected. At least 16 extra prices are reduced from $.25 per cwt to $3 per cwt.

There are seven or eight increases on total order charges for quantities of 4999 lb and under. But even here, these are offset by substantial item quantity reductions if items of 900 lb or less are combined into total 1000 lb order quantities or more. Savings can reach $3 per cwt.

The System—For example: If five items weighing less than 100 lb each are combined into a total or-

New Steel Service Center Extra Charges

■ **Here are the new extra charges, by item and order quantity.**

They are in effect at Pittsburgh, Cleveland, and St. Paul. A 20,000 lb order quantity, and a 10,000 lb item quantity is used as the base.

To find extra charges, locate total weight of the order at left of chart.

Follow the column across the chart to get the item extra for each item in the total order, using the item quantity amounts listed at the top of the chart.

For instance, if the total order weight is over 5000 lb but is no more than 9999 lb, locate the 5000-9999 lb column at the left of the chart. If item included weight between 100 to 399 lb the extra charge is $3.20 per cwt. This is a savings of $2 per cwt. Similarly, a 2000 lb order of items weighing under 100 lb can be purchased at a savings of $2.80 per cwt.

Total Order	Item Quantity Extras (Dollars per CWT)						
	10,000 lb and over	5000 to 9999 lb	2000 to 4999 lb	1000 to 1999 lb	400 to 999 lb	100 to 399 lb	Under 100 lb
20,000 lb and over	Base	.10	.35	.85	1.75	3.00	4.00
10,000 to 19,999 lb	.10	.20	.45	.95	1.85	3.10	4.10
5,000 to 9,999 lb		.30	.55	1.05	1.95	3.20	4.20
2,000 to 4,999 lb			.85	1.35	2.25	3.50	4.50
1,000 to 1,999 lb				1.85	2.75	4.00	5.00
400 to 999 lb					3.75	5.00	6.00
Under 400 lb						8.00	9.00

der quantity of 400 lb or more, savings amount to $1.50 per cwt, compared with past extra charges.

Service center sales chiefs estimate that about 75 pct of warehouse tonnage sold will continue at present prices, or with price reductions. Three-quarters of service center tonnage is marketed in order quantities of 5000 lb or more.

Lower Prices—The general effect: A price reduction. Joseph T. Ryerson, in an earlier statement, put the average reduction at about $1 per ton in a customer's steel buying costs.

Items of less than 100 lb will carry the same markup ($9) as items of less than 100 lb that have been combined into a total order of 399 lb or less. If you're buying a sample of steel, don't accumulate orders unless you plan to buy more than 400 lb of samples. If you can, the extra charges sink to $6 per cwt. This applies at St. Paul, Cleveland and Pittsburgh.

A Close Eye—Will the new pricing structure spread? At the moment, it is confined largely to the cities listed above. Service center operators are watching Chicago prices closely. If the new item quantity charges go into effect there, Indianapolis, Rockford, Moline, St. Louis, Milwaukee, Peoria and Kansas City would probably adapt the system.

The price changes don't imply that service center business is going through the floor. Robert G. Welch, executive vice president, Steel Service Center Institute, told The IRON AGE last week that the industry should hit 8.6 million tons in sales this year. This is against 9.5 million tons in 1959. The previous record was set in 1956, when the industry marketed about 8.6 million tons.

Business Off—But there is no doubt that service center business is declining. Individual sales reports at the beginning of this month show drops of as much as 50 pct on the West Coast, as much as 15 pct in the East, and 10 pct in the Midwest, from early 1959 levels.

Alumina Hits New Missile Market

■ The trend to ceramics for some missile parts is opening rather than closing the door for the aluminum industry.

For instance, the "beak" of the Sparrow III, a U. S. Navy air-to-air guided missile, is made of alumina, the oxide from which aluminum is smelted.

The supplier is Aluminum Co. of America. The fabricator is Gladding McBean & Co., Los Angeles.

For Shooting Blind—A pilot may fire Sparrow III without seeing his target because Sparrow's radar will track its prey and make continuous changes in course. Alumina is more effective than metals for the nose cone because it is completely transparent to the vital radar signals.

Alumina is also better, says H. P. Bonebrake, Alcoa manager of chemical sales, because of its very high strength, resistance to the shock of rapid and extreme changes of temperature, and to the accelerated erosion when the missile rips through rain clouds at supersonic speed.

High Flyer—Because of these, as well as its tracking ability, Sparrow III can be dispatched at targets flying higher than the mother craft can go.

Alcoa also says its special grade alumina is being supplied to other ceramic companies for research and development of similar applications.

ORDER FOR ORDERS: Steelmakers are turning to electronic computers to speed work, cut costs. This IBM system at Sharon Steel Co. processes all order entries, facilities loading, scheduling, inventory control, billing, and invoicing programs for the entire company—more than 400 repeat orders daily.

Automation Aims At Managers

New computers will handle decisions involving both machine and overall plant operation.

Few production workers will be affected. The idea is to extend, and improve high level thinking.—By G. J. McManus.

▪ Big programs of computer controls in the steel industry show signs of turning into a push for automation of management as well as equipment.

The mills are going in many directions with computers and no one is sure exactly what benefits will result. But recent moves show steelmakers are groping toward something more than elimination of a few operators.

What seems to be coming is faster, tighter management at all production levels. Electronic devices are being groomed to handle decisions involving both machine operation and overall plant operation. Management is using the computer to extend, speed and improve high level thinking.

Uses for Computers—Specific activity takes three forms:

Computers are being installed for direct control of individual machines.

Electronic devices are being provided for high speed logging and printing of data.

Central computer stations are being developed to tie successive operations together.

Control systems vary in complexity. On the finishing stands of one hot strip mill, a computer will come up with a pre-planned schedule of roll and gage setting. On a plate mill, pre-planned cards will be used but will be modified by electronic computation.

The systems of two big reversing mills will go a big step beyond any of these. Here the computers will be told only the input and output sizes of slabs. The computers will work out the full schedule of passes, checking results and making changes as necessary.

Electronic Slide Rule—In setting schedules, the computer will work to reduce a slab in the fewest possible passes. It will consider metallurgical and machine limitations. And it will be guided by established engineering principles and the latest optimizing techniques.

In effect, this approach gives management direct control of a machine. "It's the same as if you had an engineer with a slide rule in the pulpit," explains an engineer. "The mill is being managed rather than operated, but the management is in highly automated form."

Incorporated in computer controls and also functioning as separate systems are data logging devices. Tinplate lines, tandem cold

mills and other major units are being equipped with data loggers. A single supplier has sold six systems of this type in recent months.

Story of a Coil—Crucible Steel's new strip mill will be equipped with a system of data read-out and data logging. The complete production record of a coil—with time, delays, and production control by grade—will print out in the production control office. Accounting will get data pertaining to cost, inventory control, payroll and production.

This kind of data handling has many advantages. It gives management a fast, accurate picture of what is happening in the plant. It protects quality; logging devices can be equipped with alarms and shutoffs. There can be provision for storing and analyzing data.

Free Inventory Dollars—If successive operations can be tied together by a central computer, the reduction in delay time could free inventory dollars and cut production cycles overnight.

Computer men admit it is easy to go overboard in this respect but they point out how much room there is for improvement in things like scheduling. "If it takes seven weeks to turn out an order, six of these weeks are delay time between operations."

One effect of these delays is to increase the amount of inventory in process. This is a tremendous cost; a medium sized mill can easily have $40 million tied up in process inventory. Computer experts say a 20 pct reduction in this outlay is definitely possible.

From a cost standpoint, management automation could have more immediate impact than machine automation. Computer controls are expected to boost the efficiency of individual mills. However, modern mills are already highly automated and it is not easy to prove that new controls will bring significant gains.

General feeling seems to be computers won't reduce labor costs directly but they may dilute costs by boosting output. And a big part of the boost could come from more efficient management.

Space Marketing Has Its Problems

Missile and space programs will grow more complex in the future.

But there will be problems in selling to these markets, and not all have easy answers.

▪ The missile business is one of low unit but high dollar volume. It presents special marketing problems to companies in the field or that want to get into it.

In Washington last week a panel at the National Rocket Club's National Missile Space Conference tried to answer some of the questions about space marketing.

No major changes are likely in the way the government hands out missile contracts. But some refinements are expected.

Dynamic Business — The Air Force, responsible for major weapon systems, will continue to rely on one contractor to develop and integrate a given system, according to Lt. Gen. Mark E. Bradley, Jr., deputy chief of staff, Material Headquarters, USAF. But he notes, "This business is dynamic and it cannot be handled by static policy."

One possible change: The Air Force would like to use more "qualified selection" of contractors —asking only several proven companies to bid on projects—rather than competitive bidding open to all. It would save time and money for both the government and the companies, said the General. Congress would likely oppose such a move, however.

Room For the Best—All of industry's brains will be needed. Large weapons systems in the future will be more complex. They'll place a greater burden on the nation's technical abilities, predicts R. R. Kearton, assistant general manager of Lockheed Aircraft's Missiles and Space Div.

He believes future emphasis will be on quality and reliability. But to stay in the missile field, he warns, "Companies must offer more than enthusiasm."

How will these changes affect smaller companies in the field? "There will be room for the best little companies and for the best big companies," he says. "But there's no room for anything less."

How to Sell — J. W. Crosby, president, Thiokol Chemical Corp., notes: "Competition is getting fiercer all of the time." As a result, he says, more attention must be given to marketing.

"Much more emphasis must be placed on what you have to offer. We're at the stage where ability to produce exceeds our ability to sell." Thiokol, he says, has lost contracts because a presentation "wasn't adequate." He suggests: "Engineers must get more of a sales slant in their presentations."

All of the companies are concerned with the high cost of submitting bids.

Need to Communicate — N. I. Schafler, president, Consolidated Diesel Electric Corp., asks that prime contractors firm up make-or-buy decisions before asking proposals from suppliers. Or, he suggests, less elaborate proposals could be used.

But one of the most serious problems faced by small companies is communications. They can't afford enough salesmen to know all of the sales, purchasing and engineering contacts of all prime contractors.

The big companies can help in this. Lockheed has set up a Vendor Relations Dept. in its purchasing group. Its job is to know who is interested in what and to take the supplier directly to the engineer or purchasing man concerned.

Planning and Research Needed To Market a New Process

Koppers and Strategic Materials proved how far an organized, educated push can go in introducing a major process.

Their progress with Strategic-Udy process for direct reduction shows how to do it successfully. —By G. J. McManus.

▪ Planning and study are needed to develop and market a major new process. A lot depends on the companies involved. But the experience of Koppers Co. and Strategic Materials Corp. with the Strategic-Udy process shows how it can be done.

This timetable illustrates how fast a new method can move when given an organized, educated push:

Fast Pace—Koppers and Strategic Materials officially introduced the Strategic-Udy process for making iron and steel in March, 1958. Only a year later, the first commercial installation was announced by Quebec South Shore Steel Corp. Six months later, Webb & Knapp, Inc. revealed plans for another Strategic-Udy application in Arizona. (The IRON AGE, Oct. 1, 1959, p. 46.)

Points to Remember—The principles that made this timetable possible could apply to developing and marketing other systems, processes or machines. Based on the Strategic-Udy story, these are the things to do:

Make a study of the process field before thinking about commercialization.

Offer prospects more services than those offered in normal selling (Ordinary sales policies may not apply in fixing charges for these services.)

Consider commercialization may be a long pull. The job of organizing personnel and methods won't wait until the process is accepted.

Concentrate early on the most favorable marketing prospects.

Avoid some of the hazards in selling by developing sound data and steering clear of premature claims or publicity.

KOPPERS' DR. W. C. RUECKEL: "It isn't enough to tell a prospect your process is technically sound. You must show him how he can manufacture and sell the product at a profit right now."

Getting Together—Koppers and Strategic Materials came into the Strategic - Udy process independently. But it was only natural their interests would blend—and complement—each other.

Koppers, a leading builder of coke ovens and blast furnaces, got interested in direct reduction of iron in the mid-1950's. Preliminary studies began in 1956 when a research team was formed. More than 30 iron-making methods were studied.

The reports on Strategic-Udy were highly favorable. This is a process using a rotary kiln for prereduction of the iron ore. Then an electric furnace is used for final reduction to pig iron or semi-steel.

Technical and cost considerations swung Koppers toward Strategic-Udy. But the process had other advantages: It used standard industry equipment. And its development was already in the semi-works stage.

Sales Strategy—Around the same time, Strategic Materials Corp.—developers of the process—were looking over marketing prospects. Strategic felt association with a

company experienced in building and selling steel mill equipment would be helpful. Studies pointed to Koppers as the logical associate.

From this mutual interest, the two companies moved together. Strategic ran ore tests for Koppers in 1957. Talks led to an initial agreement later that year and then a formal agreement. The team was strengthened by the addition of Elektrokemisk A/S of Norway last September. This company designs electric smelting furnaces.

Search and Chose — Inquiries about the new process began pouring in to Koppers and Strategic after the first public announcement. A careful system was set up to screen these inquiries. Screening was necessary because a vast amount of spadework is needed in following up promising leads.

"At this stage, we're concentrating on situations that offer a short-term pay-out time," says Dr. W. C. Rueckel, vice-president and general manager of Koppers' engineering and construction division.

The first two commercial projects show how well this thinking has been applied. The Strategic-Udy process permits selective reduction of ores. Because of this, plans call for getting iron from abundant waste copper scrap at Webb & Knapp's proposed mill in Arizona.

Ready-Made Market — In the Quebec project, the cost of electric smelting will be held down by the use of hydroelectric power. Low grade coals will provide a cheap source of carbon for the rotary kiln. And the proposed mill will have a ready-made market at its front door.

Regarding the future, process backers are moving slowly. Talk so far has centered on the low capital costs in handling low-cost ores. Even more significant may be the ability of the process to reduce complex ores on a selective basis.

The Webb & Knapp project calls for selective reduction and others are reported interested on the same basis. Ores with manganese, chrome, nickel, and titania have been successfully smelted in test runs.

Future Prospects—So far, patent considerations and the need for more data have caused backers of Strategic-Udy to move carefully. But a big new field could open up in applications involving complex ores. Such an application would be a natural for specialty steel producers from the standpoint of material use, volume, and product price.

When does commercialization end and normal selling begin? Koppers and Strategic feel the process will be commercially proven when there are going operations in three situations: Direct reduction of low grade ore. Selective reduction of waste materials. Selective reduction of complex ores.

"We don't expect customers to start beating down our doors at that point," says a Koppers man. "But we do expect to be able to sell without getting into special financing and commercial studies."

Ready to Talk—After the first announcement in early 1958, intensive tests were run at a semi-works plant. By October, 1958, officials felt they had enough numbers to do some specific talking.

A statement was released saying a 600 ton-a-day smelting plant could be built with capital costs of about $50 an annual ton. Operating costs would be from $30 to $50 a ton of pig iron. The plant would take 1000 to 1200 kwh per ton.

Canadian Figures—For an announced cost of $16.5 million, the Quesco job called for a complete steel works with a capacity of 100,000 tons a year of rolled steel products. In addition to smelting facilities, this covers steelmaking and rolling equipment, plus other costs for a line of merchant mill products.

With conventional methods steel men figure a new integrated mill must have a capacity of at least a million tons a year. Cost of the installation this size is estimated at anywhere from $200 million to $300 million.

Tips on Marketing a Process

Launching and selling a major new process calls for these techniques, according to Dr. W. C. Rueckel, vice-president and general manager, Engineering and Construction Div., Koppers Co., Inc.

Select Your Spots — "Shifting markets, rising freight costs, and technical changes have left isolated islands of competition. Where you have these islands, you have a favorable situation for a new process. At this stage, we're concentrating on applications having the shortest pay-out time."

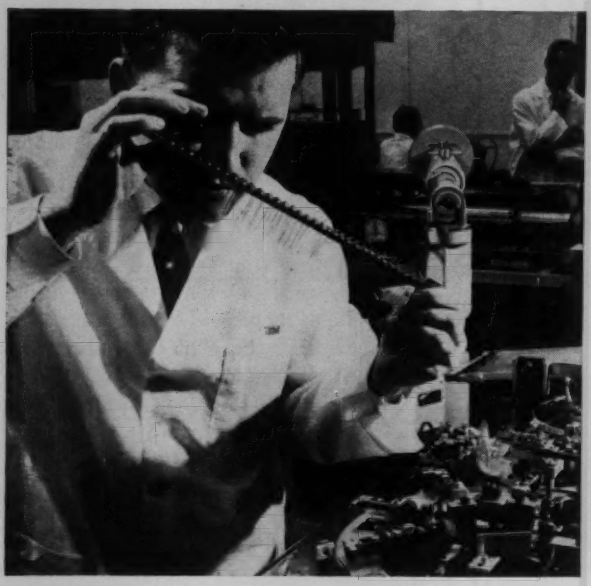
Know Your Subject — "To get sound data, you must have a prototype plant big enough to simulate production conditions. You also need a wide enough range of tests to eliminate freak results.

But with these conditions, economic analysis is mostly a matter of arithmetic. We feel we can predict the economics of a full-scale Strategic-Udy plant within 5 pct."

Prove Your Whole Case—"On a new process, you go through the whole range of selling. Our emphasis has been on the commercial and economic aspects. It isn't enough to tell a prospect a new process is technically sound. You must show him how he can manufacture and sell at a profit right now.

"We often start with a market survey. And, in addition to design and construction work, we are often asked to provide technical management services."

Miniature Assembly Line for Small Parts



ON THE MOVE: International Business Machines Corp. has built a miniature assembly line that serves an important function. It turns out 1800 transistors an hour. Working on the same principle as larger lines, it has passed its first month of successful operation at White Plains, N. Y.

IN PRODUCTION: A plug and boat are fitted together on the miniature line. Made of hard carbon, boats and plugs have tolerances as close as 0.005 in. for exact positioning of transistor parts during alloying, bonding and welding. The transistors are basic components of IBM's powerful computers.

Hearings Proposed On Price, Wage Hikes

Efforts to force the government to hold public hearings on industrial price and wage increases are being revived in Congress. The Aim: Use publicity as a lever to try to hold down these increases.

A Senate subcommittee, headed by Sen. Douglas (D., Ill.), is holding three days of hearings.

Clark Sponsors—Principal sponsor of the measure (S. 2382) is Sen. Joseph Clark (D., Pa.). It would require the President to set up a wage-price study group, which would hold hearings on any proposed or actual price increase which he decided might threaten national economic stability.

The group would also hold hearings on wage increases and their relation to price when higher pay is claimed by a firm as the cause of price boosts.

The Administration, industry, and some labor leaders have opposed the Clark proposal in the past. They contend it is a step toward broad government control of business, and could easily lead to federal price and wage controls.

Alan Wood Expands

Alan Wood Steel Co. will spend $36 million in a two-year expansion program to construct a new blooming mill and plate mill.

Harleston R. Wood, president of the Conshohocken, Pa., steel company, also disclosed tentative plans to add a hot strip mill and other buildings in a second phase of expansion. However, no timetable has been set for this.

The new wide plate mill will enable the company to roll plates up to 96 in. in width. The blooming mill equipment has been ordered from the Birdsboro Corp. The plate mill machinery will be supplied by Mesta Machine Co.

The new facilities will replace existing equipment. But work is planned to provide for continuous operations throughout construction. Completion is expected by 1961.

Senate to Investigate Materials Costs

Building materials will soon join autos, steel and drugs as subject of Senate investigations.

The Senate Antitrust and Monopoly Subcommittee, headed by Sen. Kefauver, plans to launch an inquiry into the "high prices" of building materials.

The Areas—The probe will center on the pricing of such products as glass, plumbing fixtures, asbestos and gypsum.

Sen. Kefauver claims past antitrust action has not been successful in halting the "continuous upward movement" of such prices. Relief obtained, he says, has been limited to court injunctions against "price fixing conspiracies."

The senator charges the recent hike in the plumbing fixtures industry was a "typical case" of price fixing.

Sen. Kefauver is blaming the predicted decline in new housing starts on high prices of building materials.

General Electric, as developer and user of many heat processes, has the know-how to reduce your costs and improve your product quality.

HEAT
from General Electric

How General Electric heat process know-how can cut your costs, improve product quality

There's only one correct starting point in manufacturing an industrial furnace—process know-how. By building on our knowledge of your particular heat processing problems, General Electric is able to develop the most economical heating method for quality results on your line.

Example: A commercial heat treater now saves nearly 50 percent of his raw material costs while maintaining quality specifications. General Electric understood the product requirements, and developed a heat treatment which permitted substitution of common iron for silicon steel.

Example: Shorter production cycle and reduced cost resulted when pickling was eliminated in one manufacturer's process. Bright annealing of stainless steel parts in a General Electric mesh-belt, semi-continuous muffle-less furnace produced bright, shiny parts of high quality.

Ask your nearby General Electric Apparatus Sales Office to analyze your heating process requirements. A G-E heating specialist will provide you with the "added value" service that can improve your product and save you money for years to come.

721-31

GENERAL ELECTRIC

Quantity
PRODUCTION
of
GREY IRON CASTINGS

*

ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES

*

ESTABLISHED 1866

THE WHELAND COMPANY

FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS

CHATTANOOGA 2, TENNESSEE

J. G. Richard Heckscher

He Directs Franklin Institute

Mr. Heckscher brought a great deal of engineering and administrative experience with him when he took his new post.

A former executive with the Budd Co., he now directs research and development work carried on by the Franklin Institute.

J. G. R. HECKSCHER: He brought with him administrative know-how.

▪ On Feb. 1, J. G. Richard Heckscher was named executive vice president of Philadelphia's Franklin Institute. With him he brought a wealth of knowledge in engineering and administrative technique. These are essential in his new post.

As the top administrative officer, he is responsible for the operation of the 136-year-old Institute. The Institute includes research laboratories, a technical library (160,000 technical volumes), a science museum and planetarium.

Research and Development—In the laboratories, about 200 scientists, engineers and technicians work on projects for the government, industry and small business. These men do research and development in 17 fields, including metallurgy and physics of metals. Last year the laboratories received contracts for more than $4 million.

Mr. Heckscher is no stranger to the Institute. In 1934, he first became a member (there are 7000 today). Eighteen years later he was elected to the 30-man Board of Managers which directs the course of the Institute. In 1954 he became a member of the board's Personnel Policy Committee and three years later was named committee head.

President's Words—But it is not just Mr. Heckscher's long interest and service to the Institute which prompted the Board of Managers to select him for the job he now holds. Wynn Laurence LePage, Institute president, says it was Mr. Heckscher's "exceptionally broad administrative and engineering experience" that made him the outstanding candidate for the post.

Most of his experience came from a 27-year association with the Budd Co.

Mr. Heckscher joined the Budd Company in 1933 after graduating from Harvard Engineering School. He advanced from welding engineer to manager of Navy Sales in 1936; to corporate assistant secretary in 1945; and to secretary of the Budd Company in 1952. He was named commercial products manager in 1953; vice president and director of sales of jet engine components in 1955; vice president and general manager of the Defense Division in 1957.

Wide Range—His experience has ranged from handling a broad public relations and advertising program to general administration of research in nuclear reactor components.

Not only will he administer laboratories doing research on, among other projects, nuclear reactors and glaucoma detection, but he will also supervise the educational program which includes the gamut of lectures on physical sciences and their applications for students from age 6 to 96.

One steel can solve all these tricky parts problems—at a saving!

THESE parts do hard, tough jobs so they need a steel that's hard and tough. But their intricate shapes require a steel that's especially easy to machine.

Timken® 52100 steel has all these qualities. Here is a high-carbon alloy steel with high fatigue and tensile strength—plus good hardenability throughout its cross section. Timken 52100 steel machines easily, yet its fully spheroidized structure retains full strength and hardenability. It withstands working pressures up to 200,000 psi, oil quenches to a maximum hardness of 65/66 Rockwell C in normal sections.

Chances are you'll save money by reducing rejects when you specify 52100 steel made by the Timken Company. We pioneered 52100 tubing in America and the quality and uniformity of our product results from more than thirty years experience with this special steel.

Also, we're the *only* source for 52100 steel in all three forms, tubing, bars and wire. And for small runs or emergency needs, we maintain a mill stock of 52100 tubing in 101 sizes from 1″ to 10½″ O.D. We'll be glad to furnish a complete stock list of available sizes, grades and finishes. Just write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.*

Don't Sell the Boom Short

This is not the time to be shortsighted about spending for expansion or sales.

Business is still strong, despite current worries.

■ This is not the time to sell the boom short. Nor is it the time to cut back on your spending for expansion or sales.

Despite some current doubts, the economy is still sound. Most of the business concern centers on the dropoff in auto output and a lackluster steel market. Both declines, while earlier than expected, were inevitable.

Auto production sailed along at record levels in January, 34 pct above 1957 totals. But this month assembly work "declined moderately", as the Federal Reserve Board put it.

Inventory Worries — More cutbacks are expected. But these are aimed at bringing production in line with dealer inventories.

The slight slowdown in steel buying, while upsetting now, may have some long-range benefits. User inventories are now expected to top out at about 13-15 million tons, rather than a possible 18 million tons.

Buyers are counting on mills and warehouses to hold a big part of their inventory. And they are showing caution about overbuilding stocks. But steel use remains high.

Some inventory caution now is better than panic and a buying boycott later. If production remains reasonably high, inventories will have to be maintained.

Otherwise Healthy—Apart from the auto turndown, the economy is moving at strong rates. Latest reports from the Federal Reserve and the Commerce Dept. show just how strong.

During January, the FRB's index of industrial production set a new record, 169 pct of the 1947-49 average. This was an increase of 6 pct over December. And it topped the previous high of 166 set last May and June.

Output of finished products also reached new records last month. Materials production hit the peak registered before the steel strike last summer. Output of nondurable materials stayed at record rates.

Other reports are also encouraging. Construction continues vigorous. New construction put in place (on a seasonally adjusted, annual rate) was within 3 pct of last May's record. Only housing starts showed any slackening.

Confident Buyers—Income also increased in January. The consumer appears as confident as before. Consumer buying in mid-February was moving up, according to Dun & Bradstreet. Gains over this time in '59 were noted in sales of passenger cars, appliances, and furniture.

Business men, too, are not giving up on the second quarter, according to Dun & Bradstreet's latest survey of business expectations. The majority expect gains in sales and orders over second quarter '59. Durable goods makers are slightly more optimistic about new orders than nondurable goods producers.

Manager's Status Has a Price

■ What price does a man pay for moving into the higher status management groups?

Five hardships are given by George S. Odiorne, director of the University of Michigan's Bureau of Industrial Relations. The management man must sacrifice his leisure time, he says. Then he must give up "the life of the mind." He'll find little or no time to read books other than business magazines, and an occasional business book.

Less Family Life—If he's committed to a hunt for status, he must give up cultural and aesthetic pursuits — those of the easy-going and relaxed mind."

He must not expect a normal family life. "It's true that he'll fly in a company plane, but he'll do so at the expense of playing ball with his kids, or helping them with their homework."

And, finally, he must live a rootless existence. "A corporation man . . . will sacrifice most of the stability of living in one place . . . and building personal and family relationships in the same town. He is a transient who moves up by moving around."

Dividend Payments Rose in January

Company dividend payments last month were 10 pct above the same period a year ago, Commerce reports.

Payments by corporations issuing public statements were $960 million, up from the $870 million for December, 1959. The gain from the fourth quarter of '58 to the same quarter in '59 was 10 pct.

30 SECONDS TO FAILURE!

—and somebody's reputation is shaking

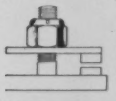
When pounding vibration shakes loose common fasteners like these, critical working parts of a product usually fail. When this happens, the reputation of the manufacturer is shaken, too.

Elastic Stop® nuts will not shake loose. Each nut uses the exclusive red nylon locking insert to provide a continuing locking torque which absorbs impact and shock loads and holds under the most severe operating conditions. In the long run, it is exactly this capacity to lick vibration-induced failure that makes Elastic Stop nuts the most economical fasteners you can buy.

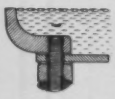
Elastic Stop nuts cost only a little more than the combination of fasteners used here. But can you afford the *real* price of any low-cost fastener that fails to provide reliability? For it's precisely this type of false economy that ruins reputations when customers incur costs for repairs, downtime and loss of production. As a matter of fact, the cost of extra field service may wipe out the manufacturer's profits, too.

Detailed photos are available showing exactly how Elastic Stop nuts solve critical fastening problems on rock drills, scrapers, snow plows, off-the-road trucks and other heavy equipment. You can see these photos simply by writing to us. Or, we can send you test samples of the fastener sizes you need. Just write: ***Dept. S42-277, Elastic Stop Nut Corporation of America, 2330 Vauxhall Road, Union, N. J.***

Elastic Stop nuts offer 3 important design advantages:



Precision adjustment at any point on the bolt



Prevent leakage along bolt threads

Nylon locking insert is re-usable 50 times or more

ELASTIC STOP NUT CORPORATION OF AMERICA

Automakers Battle the Bulge

Engineers Want to Eliminate Medial Hump

Automakers are working to get rid of the medial hump housing the transmission and driveshaft.

More passenger comfort is one reason. Another is newer and slicker styling.—By A. E. Fleming.

▪ Detroit engineers are working hard to make car floors flat.

They are eagerly testing varied ways to level the humps housing transmissions and driveshafts.

Why the battle of the bulge? A major reason is passenger seating comfort. It is a recent problem. As cars became lower during the 1950s, transmission and driveshaft tunnels took up proportionally more inside area. The mid-seat passenger in front and back became compressed, as if in a capsule, knees nearly touching chin.

Lower Models—Some car makers offered individual bucket-type seats. But this wasn't an ideal solution. Most people still want six-passenger cars.

Another point in eliminating the hump is styling. Without the hump, designers will be able to develop even lower models, closer to the ground for better stability and sleeker for better looks.

Three-Way Battle—Right now it looks like the fight against the hump is being waged on three fronts by General Motors, Ford Motor Co. and Chrysler Corp.

GM's attack is already underway. Buoyed by praise for its flat-floor Corvair, GM will apply the transaxle principle to more cars.

Supposedly, the rest of the GM lines will get similar treatment in 1962. In the meantime, slimmer automatic transmissions are a prospect for Buick, Oldsmobile and Pontiac standard models and Buick and Oldsmobile compacts next fall.

The Tip-Off—Hint of the transaxle trend came recently from Dana Corp. The automotive supplier said its business will rise in the next few years as car makers try to smooth out their floors. Dana makes universal joints used for complex driveshafts which are necessary in cars with the engine in front and transaxle in back. A flexible steel shaft must snake its way from the front engine to the transmission in the trunk area. This is the kind of mechanism Pontiac and Cadillac are testing today with eyes on fall introduction.

Ford Motor Co. isn't eliminating another possibility. Reportedly, the company is seriously trying out front wheel drive.

Tests Underway—Ford is farther away from front wheel drive than GM is from its transaxle. Estimates are Ford couldn't come out with it before the 1962 model year. Rumors are front wheel drive tests are being conducted with Ford

Another Compact Car Enters Competition

FIRST OFF: The first Ford Comet is driven off the assembly line at Lorain, O. Production of the new compact started last week, is expected to reach 500 daily by March 1. Suggested retail price will be $1998.

compacts and the Thunderbird.

Chrysler views the vanishing hump from still another angle. It is said to be sold on the idea, at least presently, of moving its engines farther forward. Mercury did this with reasonable success on 1959 models. The area of the hump inside the car was cut by about 50 pct.

Radical Steps — Whatever tack automakers take in straightening out the humps, they will come up with some radical design and engineering steps. Perhaps the most radical is front wheel drive. However, a dozen or so foreign cars, notably the French Citroen, use it.

Front wheel drive is the opposite of the Corvair concept, in which the transmission and differential are a single unit in the rear, close to the engine. Front wheel drive has all three elements in front. The front axle propels the car, and is similar to a conventional rear axle except for added steering features.

White to Build Small Trucks

White Motor Co., for 60 years a leading heavy-duty truck producer, will take a crack at the multi-stop delivery field.

The move is in line with a trend toward diversification by many of the country's truck makers. More companies are expected to plunge into the "small truck" business in the near future. It's a rich field, apparently, as indicated by the success of the small Volkswagen truck in the U. S., and International's Metro-Mite, a 13 ft long model with a 51 hp engine.

Compact Trucks — General Motors, Ford Motor Co. and Chrysler Corp. are going to join the rush with truck adaptations of the compact cars. Production of the Ford model is set to start this month at Lorain, O.

Customers for White's new models will be culled from the ranks of tradesmen in such lines as dairies, laundries, department stores, bakeries and florists.

Five Models—Among the standard features: Unitized body construction; fiberglass roof; removable power dolly, so the front-end power assembly can be removed as a unit for major engine repair or overhaul. Fiberglass side panels will be available as an option.

There are five models, ranging in length from 178 in. to 240 in. Engines are special adaptations of the Willys 4-cyl, 70 hp powerplant and an optional 6-cyl, 111 hp version.

The trucks are being built in the Montpelier, O., plant of the Montpelier Mfg. Co., truck body and delivery truck maker bought by White last October.

Chrysler Reports Loss Of $5.4 Million

There were lumps in the throats of Chrysler Corp. auditors as they closed the books on 1959. They swallowed another loss, this time $5.4 million. However, it wasn't as hard to take as recession-year 1958's $34 million deficit.

Two factors cramped Chrysler's efforts last year. One was the steel strike. Like other auto companies, Chrysler was forced to pay top dollar in the final quarter for conversion, warehouse and imported steel to keep assembly lines moving. Unlike other companies, however, Chrysler had to curtail output earlier in 1959 when a strike hit its major glass supplier.

Higher Expenses—In trying to turn 1960 into a profitable year, Chrysler unloaded a bundle of money for new models. A record $163 million, nearly double 1958's $87 million, was spent on special tools, dies, jigs and fixtures for 1960 cars. Another $78 million went for plant improvement and replacement in 1959 compared to $63 million in 1958.

Will these huge outlays pay off in a greater share of new car sales? L. L. Colbert, Chrysler Corp. president has high hopes.

Introduction of the Valiant and Dart in the lucrative low-price, high-volume field; change to unitized body construction in all except the Imperial line; a new and improved family of 6-cyl engines in an expanding 6-cyl market; realignment of the dealer group by setting up Dodge-only dealerships and giving greater individual market potential to Plymouth dealers.

Is The Electric Car Coming Back?

▪ Talk of an electric car revival is turning up again. A Lansing, Mich., manufacturer says he has an electric runabout that will be coming out of his factory in about six months.

He is S. P. Kish, Kish Industries, Inc., maker of plastic dies, plastic paints and resins for the automotive trade.

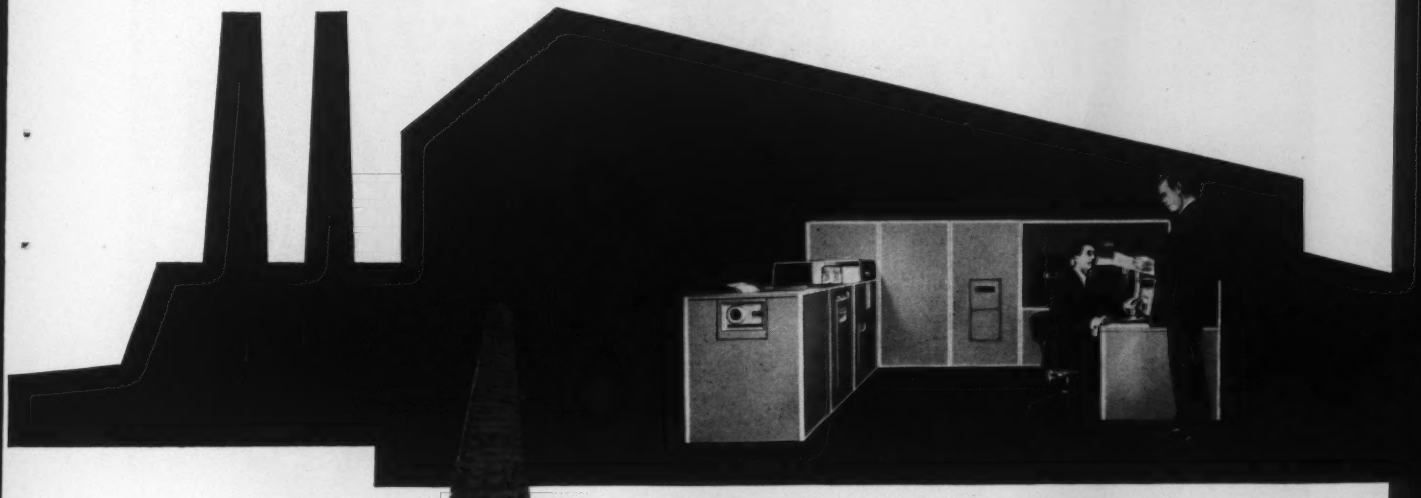
The Starlite—Mr. Kish's production target is 5000 units the first year. Called the Starlite, the car packs a 72 volt battery and is powered by two 4.2 hp electric motors, one mounted at each rear wheel.

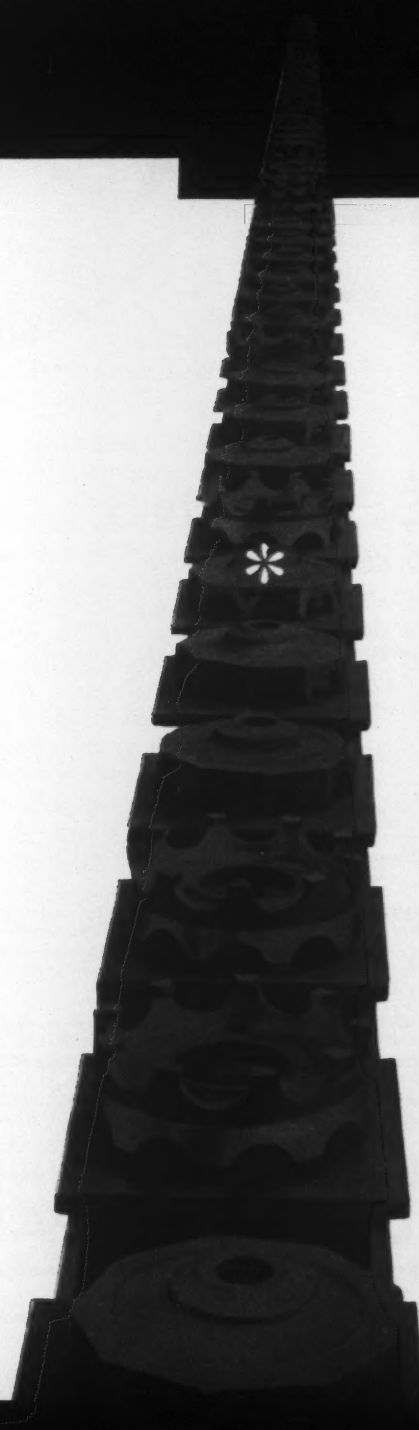
Like most electrics, the Starlite's range is limited. It can travel 65 miles without a recharge. A built-in recharger can be plugged in for overnight duty. Top speed is 50 mph, indicating it's strictly a city vehicle.

Plastic Body — The Starlite's body is plastic. Measurements: 82 in. wheelbase, 148 in. long, 62 in. wide, 55 in. high. Roughly, it's about the size of the English-built Ford Anglia. The top is optional, either Fiberglas cloth or clear Plexiglas.

Mr. Kish plans a 2-passenger model first, selling for around $3000. A 4-passenger model is on the designing board. Production is planned at the Kish plant in Lansing, possibly at a Trenton, Mich., plant later.

one late decision on inventory and this $50 part* could cost you $5,000





IBM RAMAC® 305

controls inventory data to prevent costly "out-of-stock" conditions

A delay in production caused by an "out-of-stock" part can make that part the most expensive item in your stock. IBM RAMAC 305 gives you the fast and accurate control over inventory that helps you avoid costly shortages—or equally costly overstocking.

As each transaction is entered into RAMAC, all affected records are immediately posted and updated. Management may inquire as to the status of any specified item in inventory. This random access ability is an exclusive feature of the IBM RAMAC.

Balanced Data Processing . . . IBM services as well as machines . . . is a continuing responsibility of IBM to its customers. Like all IBM data processing equipment, RAMAC 305 may be purchased or leased.

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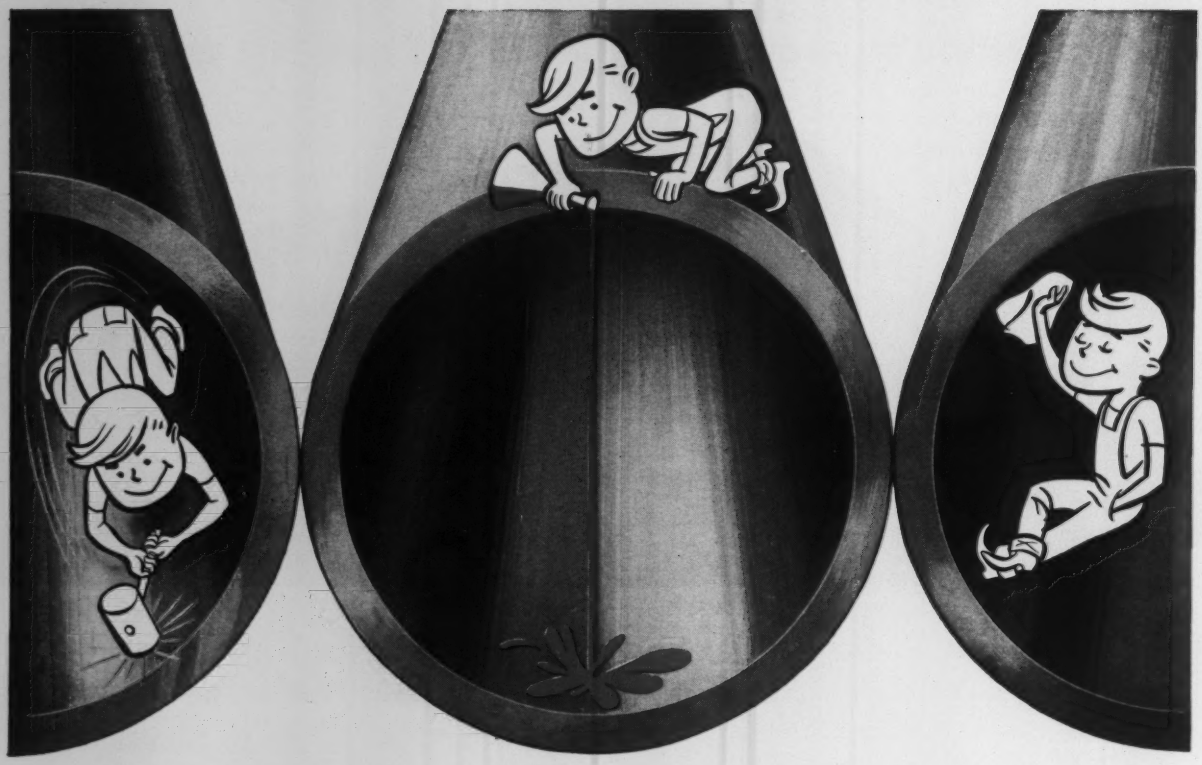


The smoother surface of CONTOUR-WELDED* STAINLESS TUBING *gives it greater resistance to corrosion*

Recent tests prove: (1) *Contour-welded* tubing is smoother than any other tubing, and (2) this extra smoothness provides greater resistance to corrosion.

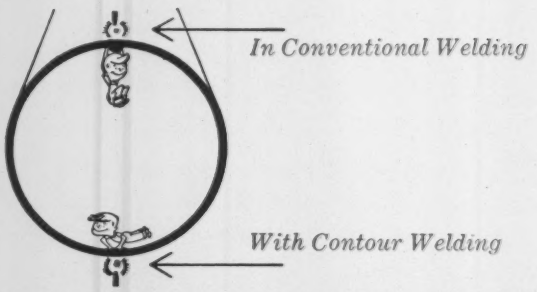
Here's how TRENTWELD® tubing, made by the exclusive *Contour-Weld* process, compares with other full-finished tubing:

- It's smoother than seamless because it's formed from uniformly rolled strip steel, whereas seamless is extruded or pierced.
- It's smoother than other welded tubing because the *Contour-Weld* process, patented by Trent, virtually eliminates the weld bead.

Other tests prove this smoother surface provides *increased resistance to corrosion* — because there are fewer focal points for corrosive attack. Not only that, the smoother surface ensures *longer fatigue life* and *less product incrustation.*

But get full details. Our free 48-page *"Trentweld* Manual" gives complete data on *Contour-Welded* tubing in sizes from ⅛" to 40" O.D., in stainless and high alloy steels, titanium, zirconium, zircalloy and Hastelloy.† Write: Trent Tube Company, Box 2518, Pittsburgh, Pa.

†Trademark Haynes Stellite Co.



In **CONVENTIONAL WELDING** of tubes, gravity pulls the molten metal down to form a bead that is difficult to remove by cold working. And cold working may lead to undercuts, focal points for fatigue cracks and corrosive attacks. Cleaning becomes difficult.

***With CONTOUR-WELDING** the tube is welded at the bottom. Gravity still pulls the molten metal down inside the tube, but now the weld area corresponds to the contour of the tube. There's virtually no weld bulge on the inside surface. And even on the O.D., the weld seam more closely conforms to the contour of the tubing.

CONTOUR TRENTWELD®

stainless and high alloy pipe and tubing

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Trade Winds Blow From Moscow

But U.S. Is Still Not Interested in Doing Business

Soviet economic leaders are hinting again about "splendid opportunities" for trade between U. S. and Russia.

Here's why U. S. leaders are still cool to the proposals.—By G. H. Baker.

▪ Fresh hints from Moscow of a rich East-West trade potential are getting a cool reception here.

The Administration and Congress both are making it clear no easing of the 15-year-old ban on shipment of strategic goods to the USSR is in sight.

Reds Are Willing — In recent weeks, several top Soviet economic bosses have spoken glowingly of the "splendid opportunities" for American makes of goods needed in Russia. They have dropped broad hints of their willingness to buy large quantities of machinery and consumer goods in the U. S. And they speak even more frankly of their desire to gain information about "new synthetic materials and technological processes."

These hints are receiving aloof treatment in Washington. On the surface, it's pointed out, Red trade proposals look attractive. But there are flaws in the "advantageous" trade offers.

Here's Why — Russian need for production equipment is genuine. But Soviet purchasers have a way of buying a few units of what they want. Once these are received future orders are cancelled, and Soviet engineers copy them. Protests against patent infringement or absence of royalty payments go unanswered.

As for Russian exports, Soviet planners have demonstrated an ability to capture large markets in a commodity with low prices. Manganese is a prime example. Once the higher-cost manganese mining operations in the U. S. and other non-Soviet areas are closed down, the USSR price is sharply increased. We're then faced with hard choices: Pay the much higher Red price, or take the slow and costly step of reopening closed mines.

Empty Pockets—What are they going to use for money? The USSR cannot hope to maintain a balance of foreign payments by matching their furs and fish against the expensive industrial machinery they propose to buy from us. Give us credit for our extra purchases, they say. But the Russian record for repayment of debts is not good.

The collapse of recent negotiations over World War II debts is a current example. The Reds simply don't pay.

Ike Asks for Foreign Aid

▪ President Eisenhower's foreign aid program now before Congress calls for $4.175 billion in military and economic assistance.

The President's aid request includes $2 billion for military assistance to Free World allies, and $2.175 billion in economic aid, for the fiscal year starting July 1.

More to Orient—Stepped up assistance for India, Pakistan and Nationalist China were proposed by the President in his special foreign aid message to the House and Senate.

Eisenhower asked for $724 million in defense support. This is provided less-developed countries principally by supplying them with commodities for consumption, and raw materials and machinery for industrial production.

Millions for Defense — The defense support total is $111 million less than he asked for last year. Fifty-six per cent of this aid goes to three Far Eastern Countries, Korea, Formosa and Viet Nam, who face the Chinese Communists on their borders.

Eisenhower supported the economic portion of his request with the argument that the United States, like it or not, has the responsibility for leadership in the world fight against economic ills.

Other categories and amounts in the economic aid field were:

Special assistance — $268 million.

Technical cooperation — $207,500,000.

Contingency fund and other programs — $276 million.

Development loan fund — $700 million.

Keep Up U. S. Guard—The President said the $2 billion in proposed military assistance "is the minimum amount consistent with the maintenance of a firm and adequate collective defense posture. Anything less in effect precludes essential modernization and improvement of forces and limits us to a bare maintenance program."

CLAD REX 10C

How CLAD-REX® can simplify production methods and reduce costs

Clad-Rex is a vinyl-metal laminate. Specifically, a calendered, semi-rigid poly-vinyl chloride film bonded to sheet metal. It is obviously a material that will give your product the almost unlimited color, style and texture of printed film *plus* the strength of steel or the weight advantage of aluminum. All alloys and tempers of aluminum and steel (including galvanized and aluminized) are commonly used. Other metals can also be used where their special properties are important to end product performance.

However, not so obvious is the practical nature of Clad-Rex. It combines finish and sheet metal into one material that can be fabricated in almost as many ways as *un*finished sheet metal. The result is an unusual opportunity for you to simplify and reduce the cost of normal manufacturing procedures. These savings in time, labor, equipment, factory floor space, rejects, etc. are worthy of close examination.

Here's why . . .

Clad-Rex is pre-finished

Unlike *un*finished sheet metals, Clad-Rex is finished when you get it. Unlike other pre-finished metals, Clad-Rex offers unusual resistance to abrasion. Normal fabricating procedures and shop handling do not damage the vinyl surface of Clad-Rex. In most cases, existing tooling can be used without change—even for deep drawing.

Unfinished metal—complex methods

The inherent ability of Clad-Rex vinyl-metal laminates to simplify production procedures and sharply reduce manufacturing costs can best be described by a comparison.

Consider, for example, a cabinet for television—Using *un*finished sheet metal, the cabinet begins in forming and drawing. Next, cleaning to remove drawing compounds, etc. then, grinding and/or polishing. Now the various attachments and supports for the television and chassis are welded in position.

The next phase is preparation for finishing. This includes several steps of cleaning and surface preparation—often special treating, such as bonderizing against corrosion.

Finally, finishing begins with prime coating. Often multiple finish coats. Then, baking. Through this sequence is inspection and re-inspection all along the way.

Now comes assembly, and more inspection. A slip of a screw driver here, or an abrasion in handling produces a reject. A reject means a complicated reverse process to disassemble, strip the paint, re-buffing and then back through the finishing line all over again.

Clad-Rex—simple, less cost

Now consider the same television cabinet. Only this time made of Clad-Rex vinyl-metal laminate—

Clad-Rex comes out of the forming dies, through inspection and directly to assembly. No buffing to remove die marks . . . no finishing of any type . . . usually no rejects during assembly either.

The time, labor, equipment, floor space, etc., required are much less. All represent a substantial savings when you use Clad-Rex vinyl-metal laminate *instead of unfinished sheet metal.* That's why, although Clad-Rex costs more going into your plant, your product made of Clad-Rex can cost less when you ship it.

A source of engineering service

Clad-Rex interest in helping you extends into your own plant. A Clad-Rex Fabricating Engineer is available to show your production people how easy it is to process Clad-Rex. Furthermore, Clad-Rex operates a fully staffed and equipped research laboratory. Its facilities are devoted to customer service as well as improving Clad-Rex products.

Write and describe your product. See how Clad-Rex can work its broad effect on your manufacturing methods and costs. No obligation. of course.

COMPARISON OF FABRICATING PROCEDURE

Unfinished Sheet Metal	Clad-Rex Vinyl-Metal Laminate
FORMING	FORMING
CLEANING	CLEANING
INSPECTION	INSPECTION
GRINDING, ETC.	
INSPECTION	
SUB-ASSEMBLY	SUB-ASSEMBLY
INSPECTION	INSPECTION
CLEANING	
BONDERIZING	
INSPECTION	
FINISHING (multiple coats as required)	
INSPECTION	
STRIPPING of rejects	
REFINISHING	
INSPECTION	
FINAL ASSEMBLY	FINAL ASSEMBLY
INSPECTION	INSPECTION
STRIPPING of rejects	
REFINISHING	
INSPECTION	
RE-ASSEMBLY	
INSPECTION	
SHIPPING	SHIPPING

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2119 Indiana Avenue • Chicago 16, Illinois
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Engineers Learn By Viewing

TV Course Is Beamed to Seven Companies

Companies in southern Calif have made it easy for engineers to continue their studies.

Lectures are given on TV right in plant "classrooms." Students get credit if they pass exams. —By R. R. Kay.

▪ There's a new TV act in Los Angeles. If it goes over, industry will have a fine educational tool.

A commercial TV station now carries a half-hour lecture program three times a week. It's on an engineering subject, given by a professor at the University of California at Los Angeles.

View and Learn—The students are 500 engineers in seven southern California companies. They follow the course in "classrooms" right in their own plants. And they get university credit if they pass their final exams.

The companies pick up the tab for the show. Both the university and the sponsoring firms are enthusiastic. They believe that such TV courses will prove far superior to regular company classes. Here's why:

One top-flight teacher can reach a vast audience.

TV techniques, such as close-ups, help students get more out of experiments and complex blackboard diagrams.

Busy engineers won't waste time driving to campus. And they'll save energy and gas.

Portland Widens Product Range

Metalworking in Portland, Ore. made fine gains in new and expanding plants during 1959. And it's likely to do it again this year.

The widening range of manufactured products is significant. New companies started to turn out plastics, adhesives, both ceramic and dry kilns, front-end loaders, sports equipment, hardwood veneers, and women's apparel.

Metals Gain—Both metalworking and lumber products showed up better-than-average in the expansion picture. New firms are now making machinery, transportation equipment, furniture, and finished lumber products.

In the area $16.6 million was earmarked for new and expanded industries last year. Another $6.7 million went for warehousing and distribution facilities. Utilities and railroads are spending $14.5 million on new projects.

Flier's Aid in Any Type of Climate

SURVIVAL HOME: Al White, chief B-70 pilot for North American Aviation, demonstrates capsule seat which doubles as a survival "home" in desert, Arctic, or ocean. This seat system for the B-70 Valkyrie has been tested in more than 60 unmanned parachute drops.

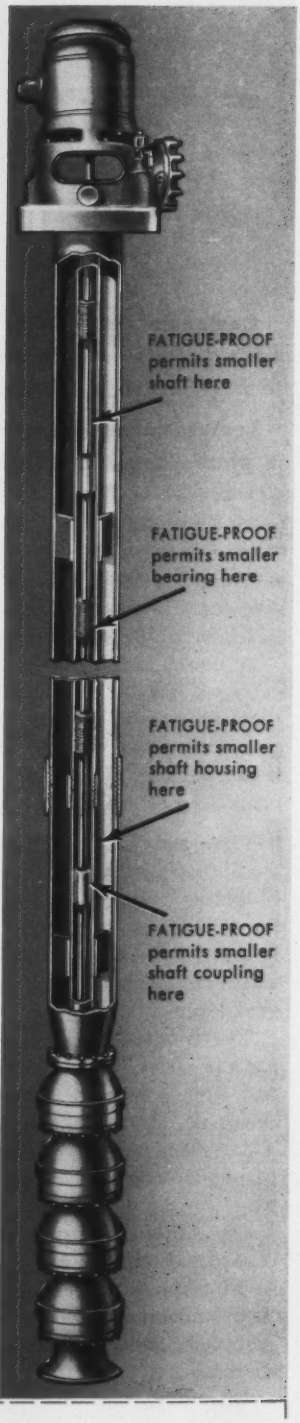
Salt River Valley Water Users Association,
Phoenix, Arizona

Saves $699.00 per pump...

by using ground and polished

fatigue-proof® STEEL BARS **e.t.d.®**

made by elevated temperature drawing process


FATIGUE-PROOF permits smaller shaft here
FATIGUE-PROOF permits smaller bearing here
FATIGUE-PROOF permits smaller shaft housing here
FATIGUE-PROOF permits smaller shaft coupling here

The men who operate the "Salt River" project have the job of supplying water to 240,000 acres of land in Arizona, where the Gila River joins the Salt River. The Association maintains some 250 deep well pumps to help supply the required water.

Richard Juetten, Supervisor of Salt River's Pump Division, reports that the use of La Salle FATIGUE-PROOF steel bars has permitted a saving of $699.00 per pump . . . a potential saving of $174,750 when applied to the 250 pumps now in operation.

Mr. Juetten's report follows:

"I have figured our direct saving realized by using La Salle FATIGUE-PROOF steel bars in place of standard C-1045 steel shaft in our deep well turbine pumps.

"FATIGUE-PROOF enables us to use bars only $1\frac{11}{16}$" in diameter . . . instead of $2\frac{3}{16}$" diameter shafts which were necessary when we used C-1045 . . . and this despite higher horsepower, more weight, and additional pump bowl assemblies.

"Here are comparative costs per 10-foot section (of a 300-foot pump shaft):"

using C-1045		using FATIGUE-PROOF	
10′ x 2-3/16″ dia. shaft	$28.30	10′ x 1-11/16″ dia. FATIGUE-PROOF	$22.59
3½″ shaft housing	26.30	3″ shaft housing	19.80
2 bearings, 3½″ x 2-3/16″	21.72	2 bearings, 3″ x 1-11/16″	13.46
Shaft coupling	5.16	Shaft coupling	2.34
TOTAL cost	$81.48	TOTAL cost	$58.19
Cost per foot	$ 8.15	Cost per foot reduced to	$ 5.82

RESULT: A saving of $2.33 per foot . . . or $699.00 when applied to a 300-foot pump setting. And this doesn't take into consideration reduced power consumption.

La Salle STEEL CO.

1436 150th Street
Hammond, Indiana

ASK FOR 24-PAGE BOOKLET—It tells the complete story of FATIGUE-PROOF®

name_____

title_____

company_____

address_____

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Mail to La Salle Steel Company, 1436 150th Street, Hammond, Indiana

Automation Aims at Short Runs

"Custom" Products Force Production Changes

Even the big mass production industries are giving way to more short runs.

Consumer demands for "custom" products cut into long runs.—By R. H. Eshelman.

■ Tooling costs are going up. But it isn't necessarily due to inflation. Instead, it's due to the growing sophistication of the American consumer.

Buyers today want "custom" products. That simple fact is making job shops out of even automotive and appliance makers — long considered the stronghold of mass production.

Broad Impact—This was one of the main points developed last week in Detroit at a seminar of the newly renamed American Society of Tool and Manufacturing Engineers.

Participants heard how vast changes are reaching down into every facet of production. Take car axles, for instance. Now a single company may make 147 different prints and part numbers.

Trouble for Tool Engineers — These product choices spell trouble for tool engineers. They must study and sweat how to get what mix customers demand without letting the tool and equipment costs skyrocket out of sight.

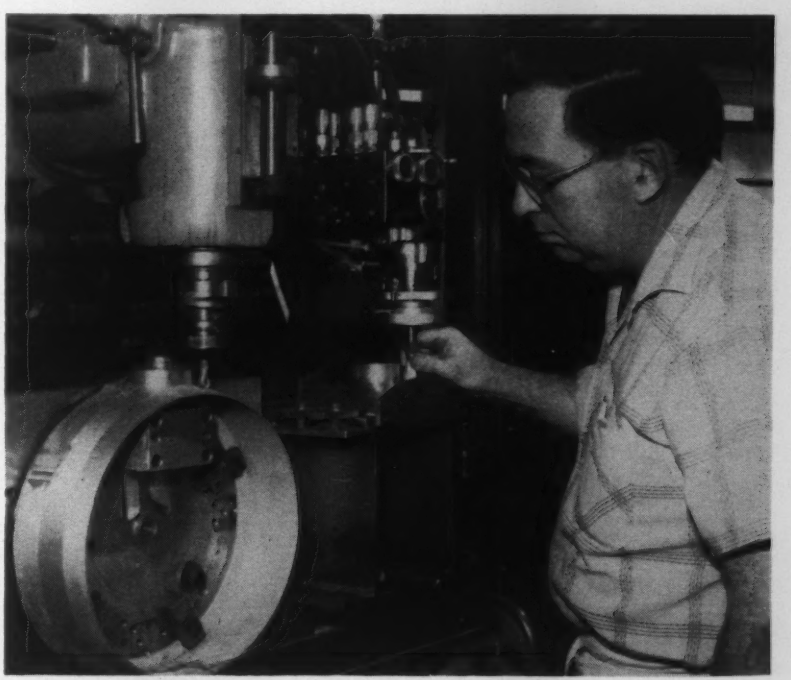
Result in many cases is modification of many of the biggest production lines. An example often cited is an A. O. Smith frame line, automated for a single part. Because of the product trend the firm had to abandon this approach.

New Approach — One of the speakers, Don A. Cargill, president of Cargill-Detroit Co., is an authority on integration of machines for automatic production. "We've virtually dropped the integrated line for a single part," he advised. "Instead, we concentrate on how to manufacture a whole family of related parts on the same automated line." Sometimes you may have as few as 150 pieces alike, he noted, but they're produced on mass production rates of say 700 units per hour, with minimum tooling changes.

In this changing picture, there are some gains, however. Small lot producers stand to profit handsomely. Automation equipment, being devised to handle the new product mix of mass production industries, is well suited to take over in many smaller shops as well. In fact, tool engineers from small plants learned how to make automation pay — and incidentically solve some of the problems of rising labor costs. Some instances cited show that automation can exist side by side or even intermixed with manual operations.

As one participant declared: "This is the hottest trend in manufacturing today — breaking automation down into smaller, more manageable bits."

Machining Molybdenum Accurately



CAN DO: Custom Tool & Manufacturing Co., Minneapolis, contour machines forged molybdenum jetavator housings for rocket engines on production basis. Few months ago this was generally considered impractical.

INDUSTRIAL BRIEFS

In Magnet Wire Field—The Viking Wire Co., Inc., has completed its new magnet wire plant in Danbury, Conn. The plant has a research lab, machine shop and 100 pct inspection of all wire products in production. Temperature is controlled in the plant. All facilities are electrically controlled. A 50 pct sales increase is expected in 1960.

Another Step for Foote—Foote Mineral Co.'s electrolytic manganese facilities in Knoxville, Tenn., are completed. Additional cells, new rectifying equipment and other processing equipment have increased the capacity of the company's Loraine plant by 30 pct.

Collapsible Tubes Expand—The Collapsible Tube Manufacturers Council reported a record-breaking 1.15 million collapsible metal tubes were sold in 1959. This is a 14 pct gain over 1958's total of 1.005 million tubes and increases were noted in most end uses. Major gains were in tubes manufactured for packaging cosmetics, and pharmaceutical and medical preparations.

Grand Span — A 1600-ft steel bridge will be built over the Ohio River near Louisville, Ky. The Structural Steel Div. of The R. C. Mahon Co., Detroit, was awarded the $5.4 million contract for the bridge by Indiana's State Highway Commission.

Cross - Country Clinics — The Gray Iron Founders' Society, Cleveland, will sponsor one day clinics throughout the country. Subject will be—"How to cut costs in designing and purchasing gray iron castings." It is intended for designers, engineers and buyers.

New Scrap Shear—A new 1200-ton conveyor-feed hydraulic scrap shear is being built by Verson Allsteel Press Co. It will be available for sale, lease or toll operation. M. S. Kaplan Co., Chicago, are the exclusive distributors.

Award for Reaction—The Borg-Warner annual award for achievement in missiles and astronautics will be presented to Thiokol Chemical Corp.'s Reaction Motors Div. Award represents development and production of the packaged liquid propellant missile engine known as the Guardian I and the Guardian II.

Optical Eyed — Ex-Cell-O Corp., Detroit, has acquired Optical Gaging Products, Inc., Rochester, N. Y. The acquisition was effective Feb. 1, making the Rochester company a wholly-owned subsidiary of Ex-Cell-O. Mr. Willis De Boer, president, Optical Gaging Products, will remain president of the subsidiary.

Getting Together—A merger of Anthes Force Oiler Co., Fort Madison, Ia. and Gleason Steel Corp. and Barnes & Smith Corp., Milwaukee, has been confirmed. The new corporation will be known as Gleason Corp. with headquarters in Milwaukee. Anthes Div., Gleason Corp. will continue operations in expanded facilities at Fort Madison.

Flats Furnished — Howell Electric Motors Co. has acquired the flat-type motor line of the Diehl Mfg. Co., electrical div. of Singer Mfg. Co. Purchase includes tooling, machinery and design used in the manufacture of flat - type Diehl motors. Howell plans to produce this line at its Leland Ohio Electric Div. plant in Dayton, O.

"Okay Brewster . . . let's see this new novel type Sweep Second hand you've thought up."

Piping Abroad—Avondale Marine Ways, Inc., New Orleans is using new pipe and pressure tubing in building cargo vessels for Mississippi Shipping Co. It is Niphos nickel alloy bonded steel pipe and pressure tubing for steam heating coils and sounding pipes. This piping is a relatively new innovation in the corrosion resistance field.

Canadian Caper—The Timken Roller Bearing Co.'s manufacturing operations in Canada, located at St. Thomas, Ontario have been renamed, Canadian Timken Div. This change is consistent with Timken's international policy of identifying manufacturing divisions of the company with the country in which they operate.

Heads Scrap Group — Michael Rosenberg, Chicago Metals Co., has been elected president of the Chicago Chapter, Institute of Scrap Iron & Steel Inc. Elected as vice presidents were: Frank Willis, Pohn Iron & Steel Co., Inc., Fred Gordon, Iroquois Steel & Iron Co., and Elliot Nickelson, B. L. Nickelson Iron & Metal Co., Inc., all of Chicago.

Aluminum Can Plant—A pilot plant will be built by Reynolds Metals Co. at Bellwood, Va. It will be known as the Container Development Plant and will house production tests on experimental aluminum cans and semi-rigid containers. Cost of the plant, land, building and equipment may exceed $700,000.

Hot Sales Agreement — Ajax Electric Co., Philadelphia, will handle sales and service throughout the U. S. on the gas-fired furnaces produced by Barkling Fuel Engineering Co., Chicago. The company will now offer a complete line of Ajax Barkling gas-fired heat treating and melting furnaces.

16 Ton "Gas Mask" for a Blast Furnace

Diversity in the production of steel castings is routine in the foundries of Erie Forge & Steel Corporation. For example, this cast steel blast furnace bell.

The 16 ton lower bell casting teams up with the one ton cast steel upper bell to distribute solids to the blast furnace without loss of gasses . . . a job which requires high quality steel of accurate as-cast dimensions.

From the beginning of the steelmaking process the raw materials are tested at frequent intervals to assure the quality of the steel . . . careful metallurgical and engineering control from scrap pile to finished casting. This is standard operating procedure at Erie Forge & Steel in the manufacture of steel castings and forgings which meet the widely diverse demands of industry . . . another of the many reasons your Casting and Forging requirements are in competent hands here. Consult with us.

ERIE FORGE & STEEL CORPORATION

ERIE, PENNSYLVANIA

MEMBER AMERICAN IRON AND STEEL INSTITUTE

G. F. Griffiths, elected president, Acme Steel Co.

Joy Mfg. Co., Western Precipitation Div.—**R. F. Stewart,** appointed vice president and asst. general manager.

Worthington Corp. — **W. C. Cheek, H. W. King** and **W. J. Van Vleck,** appointed commercial vice presidents.

Fenwal Inc.—**E. S. Welch, Jr.,** appointed vice president, engineering.

Bridgeport Rolling Mills Co.—**J. R. Higgins,** appointed controller-treasurer; **A. T. Cook,** named sales representative.

U. S. Steel Corp., American Steel & Wire Div.—**E. B. Cousins,** appointed asst. comptroller.

Bethlehem Steel Co., Shipbuilding Div.—**H. R. Pund,** named asst. vice president.

Hanson-Van Winkle-Munning Co. —**H. B. Koehler,** appointed manager, electrical sales.

General Electric Co.—**H. P. Sisk,** appointed general manager, Distribution Transformer Dept., Pittsfield, Mass.

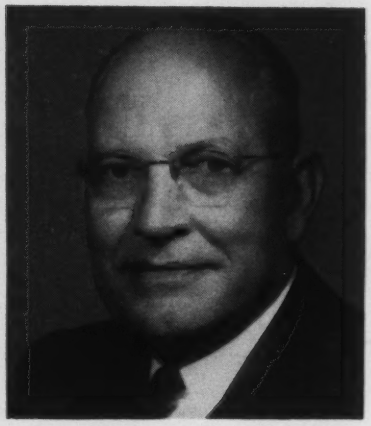
Rollway Bearing Co.—**O. J. Manse,** named manager, manufacturing.

Continental-Diamond Fibre Corp. —**M. J. Gauger,** appointed asst. to the president, and **R. F. Nelson,** to comptroller.

National Acme Co.—**R. J. Spresser,** appointed Detroit district manager.

Republic Steel Corp.—**R. F. Street,** appointed asst. superintendent, Gadsden, Ala., plant, Open Hearth and Electric Furnace Dept.

E. W. Bliss Co., Rolling Mill Div.—**Byron Mumaw,** appointed superintendent, machine and erection shops, Salem, O.



G. T. Avery, named chairman of the board, Acme Steel Co.

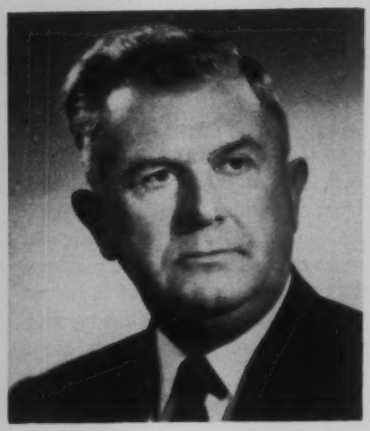
Copperweld Steel Co.—**R. F. Lab,** promoted to asst. general superintendent.

The Babcock & Wilcox Co., Boiler Div.—**R. L. Swinney,** appointed district sales manager, Denver, Colo.

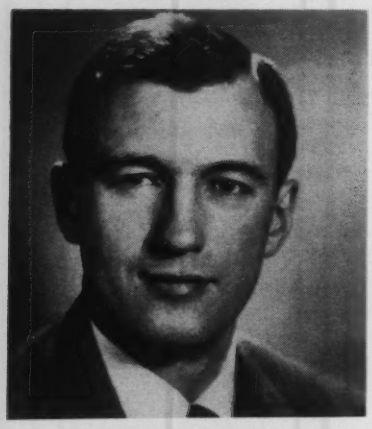
Republic Steel Corp.—**W. F. Heatley,** promoted to asst. superintendent, hot strip finishing; **K. L. Parker,** promoted to asst. superintendent, hot strip rolling; and **D. R. Bane,** promoted to asst. superintendent, silicon sheet and strip.

Wheeling Steel Corp.—**M. E. Cunningham,** appointed asst. general manager, Martins Ferry Factory; **James Clifton,** named chief

(Continued on P. 55)

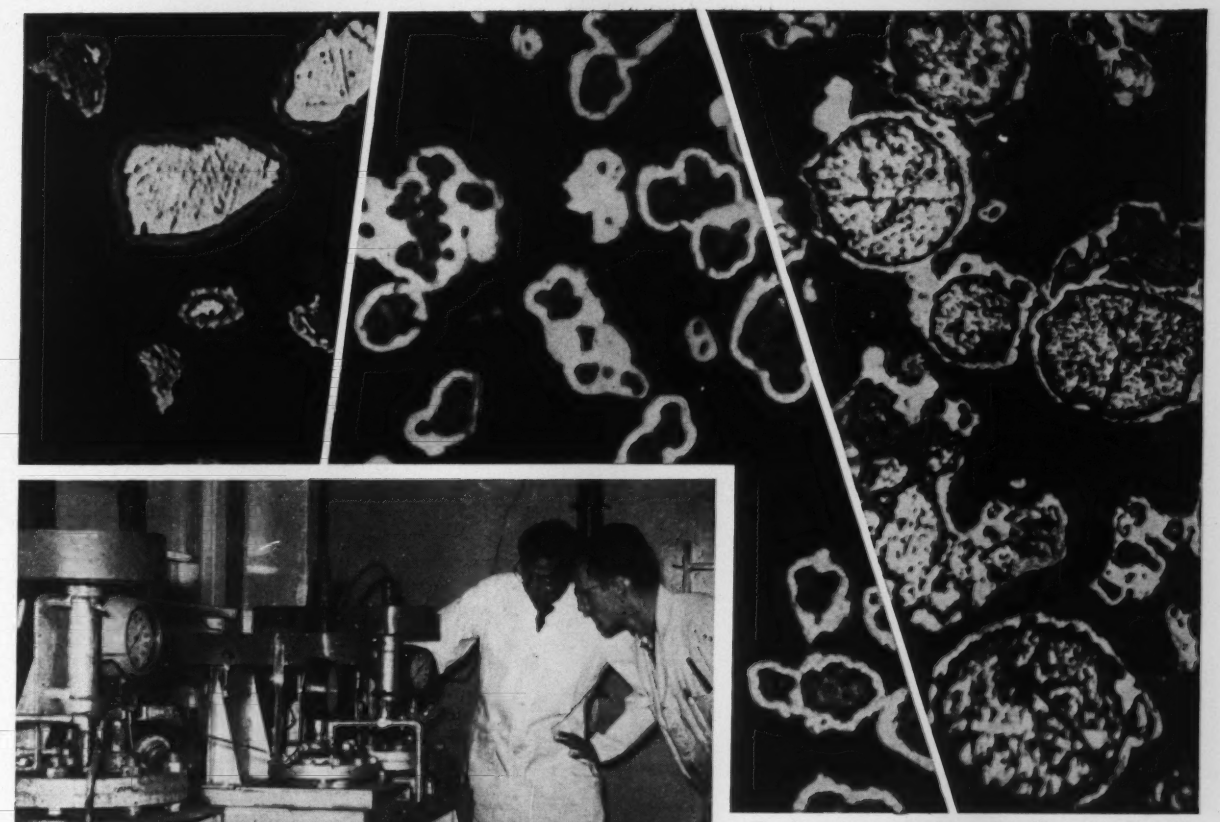


L. L. Warriner, elected chairman of the board, The Cooper-Bessemer Corp.

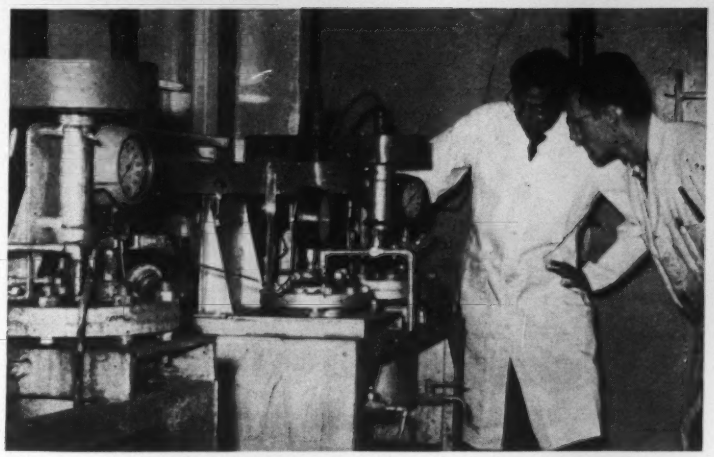


G. C. Woodard, elected vice president, marketing, The Cooper-Bessemer Corp.

H. C. Johnson, becomes vice president, manufacturing, The Cooper-Bessemer Corp.



The photomicrographs shown above illustrate a few of the many coated metal powder combinations made possible by Sherritt's patented coating process: (left to right) nickel on chromium, copper on nickel, and nickel on iron.



new techniques for solid state nickel alloying

New metal coating techniques developed by the Sherritt Research Staff have greatly advanced the art of solid state alloying in powder metallurgy. These patented techniques permit controlled coating of minute metal or non-metal powders with pure nickel or cobalt.

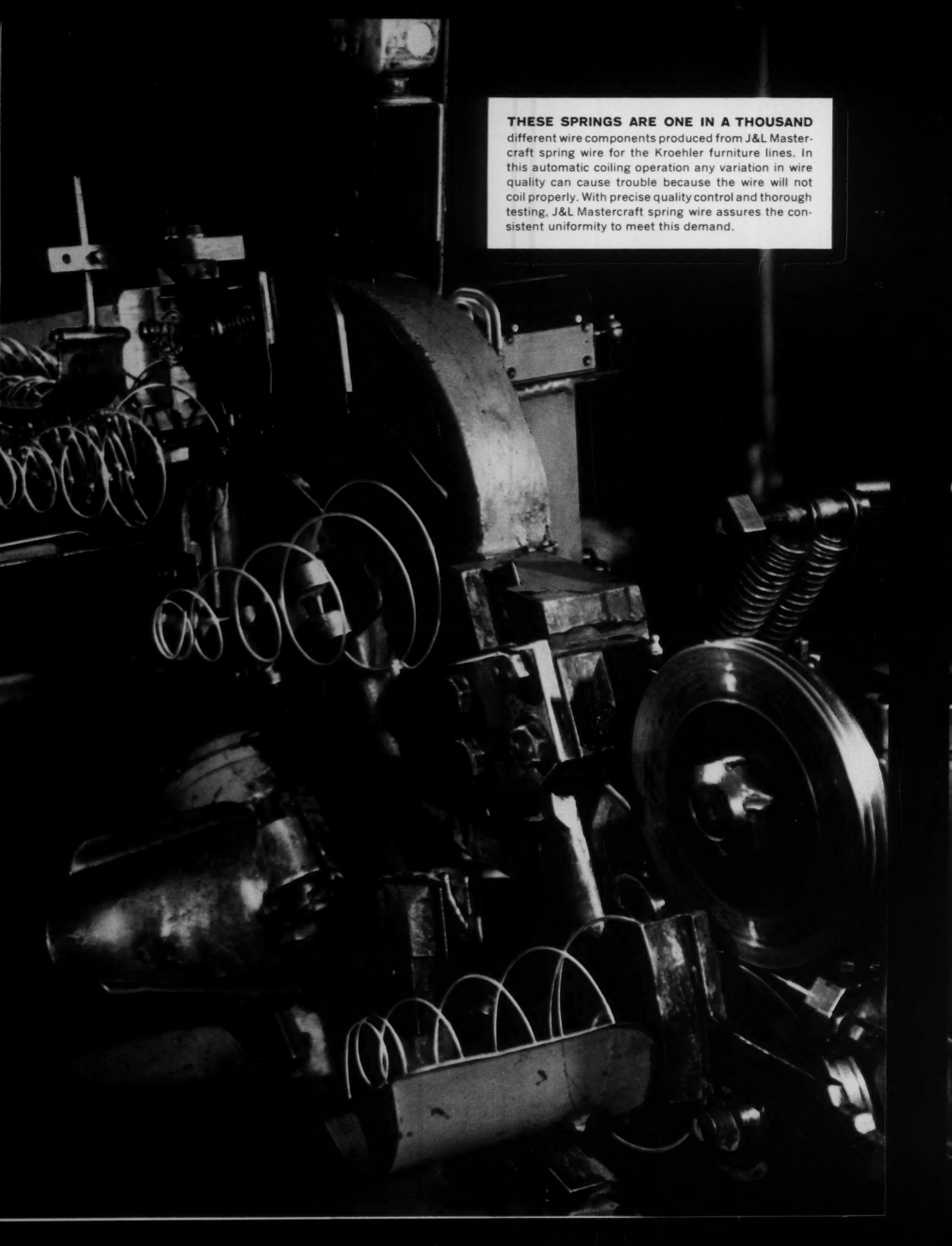
By these new techniques metal powders sensitive to oxygen contamination while in process can now be protected by a continuous coating of nickel. The coating is intimately bonded over the entire particle surface so that compacts can be produced from a completely "nickel-plated" metal powder.

Perhaps the most significant contribution of the Sherritt developments to the art of powder metallurgy is the production of the metal/non-metal combination powders. With control of the coating completely in the hands of the metallurgist, the number of possible metal/non-metal combination powders suitable for compacting applications becomes almost unlimited.

SHERRITT

FOOTE MINERAL COMPANY is the exclusive sales agent for Sherritt nickel and cobalt in the United States and Canada. For product literature, prices, and delivery information, contact the Foote Mineral Company, 438S Eighteen West Chelten Building, Philadelphia 44, Pennsylvania.

SHERRITT GORDON MINES LIMITED



THESE SPRINGS ARE ONE IN A THOUSAND different wire components produced from J&L Mastercraft spring wire for the Kroehler furniture lines. In this automatic coiling operation any variation in wire quality can cause trouble because the wire will not coil properly. With precise quality control and thorough testing, J&L Mastercraft spring wire assures the consistent uniformity to meet this demand.

Bottom cross crimps for Kroehler davenports require a spring wire that will withstand severe punishment in crimping. At this Naperville plant, capacity is over 100 units of furniture an hour.

Custom-made Kroehler cushions require many components made from J&L wire.

Spring wire cones, crimps, links and side wires are assembled on carefully fitted sofa frames.

Layers of rubberized sisal, burlap, cotton and top fabric are applied to seat frame assembly.

A skilled operator applies finishing touches to this Kroehler chair.

J&L

Over 400 separate items of furniture are produced for the Kroehler and Valentine Seaver lines by 17 plants in the U.S. and Canada. Helping to uphold the Kroehler reputation for fine furniture are the many spring wire components produced from J&L Mastercraft wire.

Report from the world's largest furniture maker...

"We reduce rejects, machine downtime and waste with J&L Mastercraft spring wire"

. . . Kroehler Manufacturing Company

"We've never had to remove a J&L Mastercraft coil from a machine . . . never had to call in J&L to solve a wire deficiency problem.

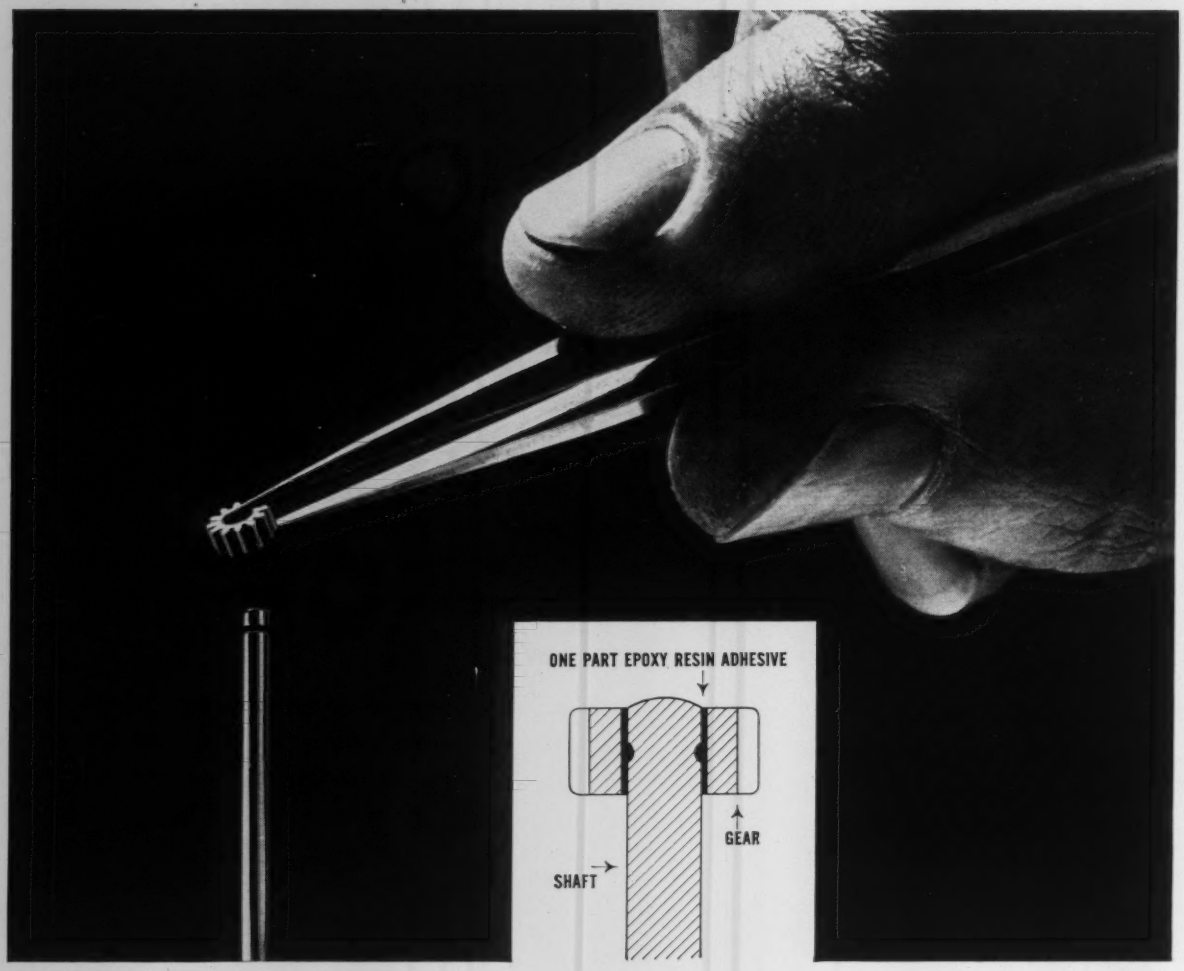
"Our machine operators are sold on J&L wire. The uniform physical properties of Mastercraft spring wire result in more uniform production runs, with fewer machine adjustments. Also, J&L's special spring wire finish does not foul our machines. That means fewer shutdowns for equipment cleanup."

Similar facts are reported by many other automatic spring-making operators. Reduced rejects, increased production are achieved because every coil of Mastercraft, hard-drawn MB or Electromatic oil-tempered MB spring wire is quality controlled, completely tested.

Try this superior J&L product. It's tops in quality, competitive in price. Contact your nearest J&L district office, or write to Jones & Laughlin Steel Corporation, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

Jones & Laughlin Steel Corporation

PITTSBURGH, PENNSYLVANIA



How fabricating with SCOTCH-WELD® BRAND Structural Adhesives eliminated 100% inspection step

Timing components now being fabricated with SCOTCH-WELD Adhesive EC-1386 meet precise specifications. The Haydon Division, General Time Corp., Torrington, Conn., is using this one-part epoxy resin base adhesive to bond small pinion gears to rotor shafts in a sub-assembly timing gear operation.

Prior to use of EC-1386, the parts were joined by brazing. But the high heat required affected the material hardness. It also produced shaft distortion, necessitating a 100% inspection step.

Then SCOTCH-WELD Adhesive EC-1386 was used. The high heat previously required was eliminated. With the end of this trouble source, shaft concentricity and material hardness were left unaffected, the 100% inspection eliminated. Close tolerance requirements between shaft and gear were also eliminated because of void-filling properties of the adhesive. A savings of $56.37 per thousand assemblies resulted.

Company after company is discovering how to save money, speed production and eliminate rejects by using SCOTCH-WELD Structural Adhesives in the fabrication of their products. Perhaps these adhesives are at work right now in operations similar to yours. Find out! For free literature without obligation, write today on your company letterhead to: AC&S Division, 3M Company, Dept. SBQ-20, St. Paul 6, Minnesota. "SCOTCH-WELD" is a Reg. T.M. of 3M Co.

ADHESIVES, COATINGS AND SEALERS DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

(Continued from P. 50)
plant engineer, Martins Ferry Factory.

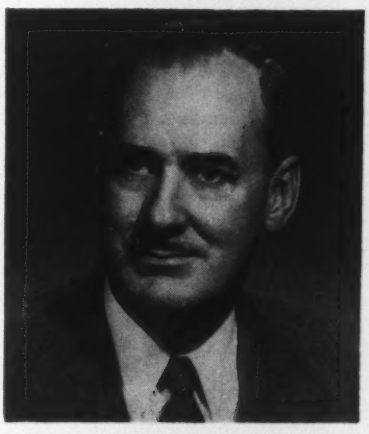
Reynolds Metals Co.—**J. M. Haney, Jr.,** named distributor coordinator, Pacific sales region.

H. W. Stephens, elected president, Berry Steel Corp.

International Business Machines Corp.—**C. B. MacKenzie,** appointed manager, research and engineering information.

Pacific Tube Co.—**W. P. Armstrong,** appointed general manager, sales; **A. C. Geldner, Jr.,** named manager, bar sales; **H. P. Shuptrine,** asst. plant superintendent; and **C. A. Taylor,** office manager.

Norton International Inc.—**Dr. W. F. L. Place,** appointed vice president and general manager; **G. W. Bennett,** appointed sales manager, refractories.



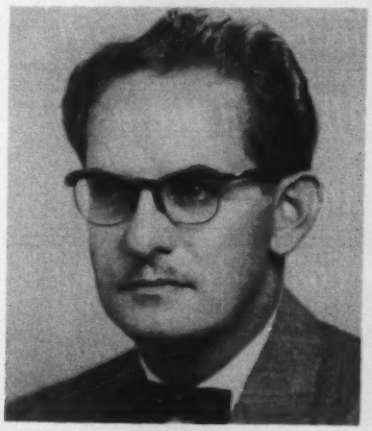
E. E. Staples, appointed president, Hevi-Duty Electric Co.

H. A. Davis, elected vice president and general sales manager, Berry Steel Corp.

H. K. Porter Co., Inc., National Electric Div.—**C. R. Billman,** appointed general manager, Pittsburgh headquarters.

Sherwin-Williams Co.—**R. H. Hill,** appointed director, sales.

Joseph T. Ryerson & Son, Inc., Industrial Plastics and Bearings Div.—**H. J. LeBeck,** appointed asst. manager.



K. E. Joy, appointed vice president, sales, Judson L. Thomson Mfg. Co.

Borg-Warner Corp.—**J. M. L. Joslin,** appointed manager, executive development and training.

National Lead Co., Doehler-Jarvis Div.—**G. F. Hodgson,** named director, research; **H. L. Byrne,** appointed asst. to the chief engineer;
(Continued on P. 58)

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IS A BETTER

COOLANT PUMP

✓ PRECISION BUILT

✓ COST LESS TO OPERATE

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MACHINERY CO.

- COOLANT PUMPS
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- MOLTEN METAL PUMPS

THIS IS DU PONT DELRIN®

a new engineering material offering the user distinct performance and cost advantages in many products once reserved for metals

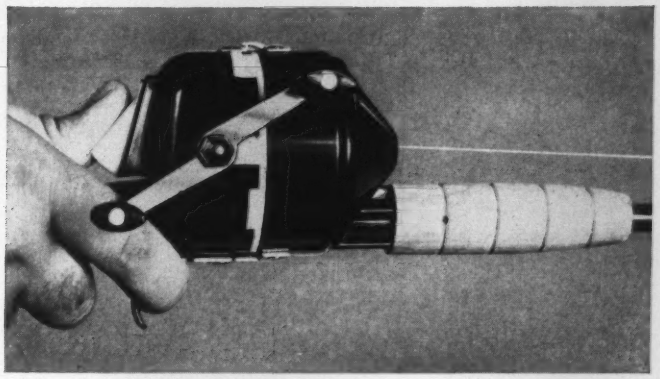
In "Delrin" acetal resin, manufacturers now have available an engineering material that offers the user distinct performance and cost advantages in many products now made of die-cast zinc and aluminum, cast and machined brass, stainless steel and cast iron.

The unique combination of physical properties and production economies offered by "Delrin" has already led to its specification for over 100 products. Three are described on the opposite page.

"Delrin" has the strength and stiffness to remain rigid in large sections; the tensile and flexural strength to withstand high-stress loadings; the dimensional stability to hold close tolerances; the resilience and abrasion resistance to operate usually without lubrication; and the chemical resistance to withstand corrosion. "Delrin" retains these desirable properties, too, even under exposure to wide temperature extremes, high humidity, corrosive solvents and stress.

Products can be economically mass-produced in "Delrin" via injection and extrusion molding . . . frequently in one-piece, integral shapes requiring no finishing operations. Parts may be joined by mechanical fasteners, spin welding or snap fittings. Production molds assure uniformity in part to part. Products can be surface-textured, painted, vacuum-metalized or made in integral colors.

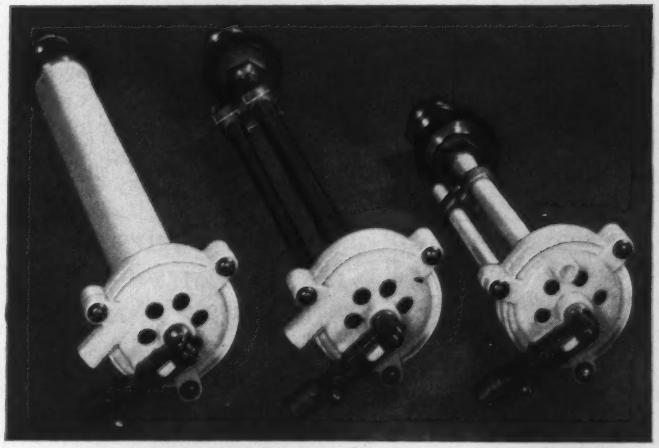
We will welcome the opportunity to assist you in evaluating how "Delrin" can help you improve a product, lower its costs or develop new designs for your profit.



The Zebco Company of Tulsa, Okla., cites "Delrin" as making possible a truly corrosion-proof salt-water spinning reel. In their "Fabulous Zebco 88", "Delrin" is used for the housing, thumb control and body. Zebco found in "Delrin" the stiffness, toughness, light weight, wear and corrosion resistance it needed. The "Fabulous Zebco 99" is also made of "Delrin" for long-lasting fresh-water *spin fishing. (Molded by Continental Plastics Co., Oklahoma City, and Ajax Plastics, Tulsa, Okla.)*

A new chain conveyor made by Union Chain & Manufacturing Co., Sandusky, O., features top plates molded of "Delrin". In switching from steel, the company states that "Delrin" offers constant dimensional stability, lower manufacturing costs and improved performance, because the smooth surface quality of "Delrin" means less spillage and breakage. (Molded by Anderson Associates, Toledo, Ohio.)

For their "Flow King" ball-cock valve (left in photo below), Coast Foundry & Manufacturing Co., La Verne, Calif., chose "Delrin" rather than brass for the valve's bonnets, because "Delrin" reduces production costs, and it has the required dimensional stability, stiffness and durability. These properties and savings (injection-molded "Delrin" eliminated all finishing operations) have prompted the use of "Delrin" for bonnets in two other valves. (Molded by Coast Craft Industries, Glendale, Calif.)



THIS IS WHAT DELRIN® IS DOING

During the past three years, over 500 applications of "Delrin" have been field-tested by some 250 manufacturing concerns. This development program measured the ability of "Delrin" to perform in actual service vs. counterparts made of metals, rubber, wood and glass. In each case, detailed cost studies were also made to measure the cost advantage of using "Delrin".

As a result, and with the recently announced commercial availability of "Delrin", over 100 applications are being put into commercial production: gears, bearings, housings, aerosol bottles, faucet parts, valves, sporting equipment, telephone components, households items and many others.

We suggest that you investigate how "Delrin" can be profitably used in the products you make and the products you use. Commercial processors and our own staff of technologists are ready to assist you.

POLYCHEMICALS DEPARTMENT

DU PONT

REG. U.S. PAT. OFF.

Better Things for Better Living . . . *through Chemistry*

FOR MORE SPECIFIC INFORMATION MAIL THIS COUPON

E. I. du Pont de Nemours & Co. (Inc.)
Department U-225, Rm. 2507D
Nemours Building, Wilmington 98, Delaware

I am interested in evaluating "Delrin" for the following use:

_____

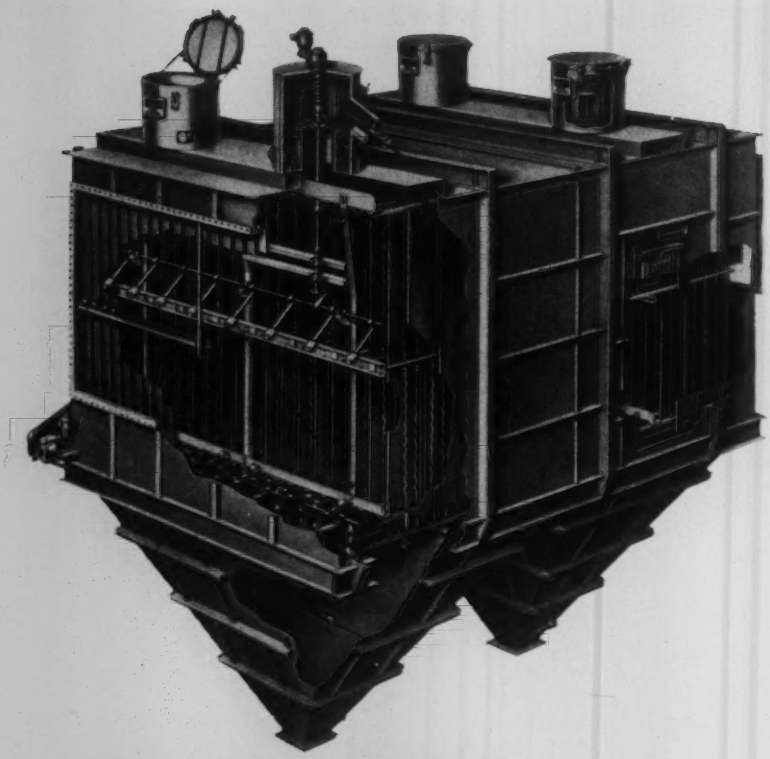
NAME_____

COMPANY_____ POSITION_____

STREET_____

CITY_____ STATE_____

In Canada: Du Pont of Canada Ltd., P.O. Box 660, Montreal, Que.



DECADE
OF OPERATION PROVES MAINTENANCE OF BUELL 'SF' PRECIPITATORS AVERAGE LESS THAN 2%

In 10 years of selling 'SF' electric precipitators, the number of replacement parts ordered from Buell has amounted to only 1.17% of the total sales! Even on emitting electrodes, usually the most vulnerable part of a precipitator, replacement has amounted to less than 1% of the original number installed. What do these extremely low percentages mean? Exceptionally low maintenance costs, for one thing, continuous high-efficiency operation, fewer shutdowns and process interruptions. Buell self-tensioned emitting Spiralectrodes eliminate vibration found in weight-tensioned wires. Buell's low maintenance precipitators will provide you with the most satisfactory operating results. They're backed by 25 years of experience in dust collection, with the practical know-how gained on hundreds of installations. Write for descriptive literature. The Buell Engineering Co., Inc., Dept. 42-B, 123 William St., N. Y. 38, N. Y. Northern Blower Division, 6404 Barberton Ave., Cleveland, Ohio.

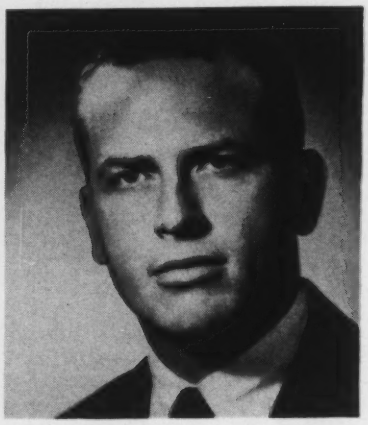
buell®

Experts at Delivering Extra Efficiency in Dust Recovery Systems.

(Continued from P. 55)

B. W. Koch, named chief product development engineer.

E. W. Adams, appointed manager, operations, eastern area plants, Kaiser Refractories & Chemicals Div., Kaiser Aluminum & Chemical Corp.



Louis Polk, Jr., appointed manager, operations, product divisions, The Sheffield Corp.

Pratt & Whitney Co., Inc.—**G. W. Steinmetz,** appointed manager, industrial distribution.

Calumet & Hecla, Inc., Wolverine Tube Div.—**J. E. O'Connor,** appointed heat transfer specialist, Cleveland district.

OBITUARIES

J. E. Menz, 51, vice president, Kaiser Aluminum & Chemical Corp.

J. D. Ramsay, former president and director, North American Refractories Co.

POSITIVE DUPLICATION – EVERY TIME!

These highly accurate apothecary weights give *exact* results, time after time after time. You will get this same kind of Positive Duplication with these center-type grinding wheels, and with *all* CINCINNATI (PD)° GRINDING WHEELS.

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The predictable performance of these wheels is the positive result of Cincinnati's unique (PD) manufacturing process. It involves 36 separate quality controls which produce grinding wheels of unsurpassed uniformity. For example, sensitive print-weigh scales put an unmistakable record on each mix card of the exact amounts of materials used. And the figures *must* correspond to the exact amounts called for.

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When you use CINCINNATI (PD) WHEELS you can plan production schedules with the assurance that each reorder wheel will act and grind exactly like the original. This is the promise—and *performance*—of Positive Duplication.

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FROM CREATIVE CRUCIBLE: HIGH SPEED STEELS THAT MAKE BETTER TOOLS POSSIBLE

UNGROUND CLASS "C" HOBS, *made from Crucible's M2S, consistently meet runout tolerances as required.*

ACCURATE HOBS— WITHOUT GRINDING!

Toolmakers hold hob tolerances to less than 0.001" without finish grinding—because of improved manufacturing skills and continually improved Rex® High Speed Steels.

Today's toolmakers are not only producing accurate unground hobs to closer tolerances – they're also making them stronger, longer-lasting and with fewer grinding stresses.

What is behind this development? It's the skill of the toolmakers – combined with continuing Crucible developments that improve the quality of Rex High Speed Steels. Crucible tool steel metallurgists, working closely with producers of fine precision tools, are able to devise mill manufacturing practices to provide steels ideally suited to specific applications.

At Crucible, Rex High Speed Steels have always been produced under the close personal supervision of the most experienced men in the industry. Today, these men utilize the most advanced electronic instrumentation to assure the production of highest quality steels. For example, they use precision instruments to control the temperature of the molten metal, in the melting furnace, so each heat is produced under identical conditions. New techniques permit greatly improved deoxidation of the liquid steel. New ingot mold designs provide freedom from segregation when the steel solidifies. And all Rex High Speed Steel billets are inspected ultrasonically before they are rolled or forged.

As a result, Rex High Speed Steels continue to make the best hobs because they offer:

more uniform distribution of carbides throughout the section. This ensures minimum size change, greater predictability in heat treatment, greater hardenability and more uniform hardness in the heat-treated tool:

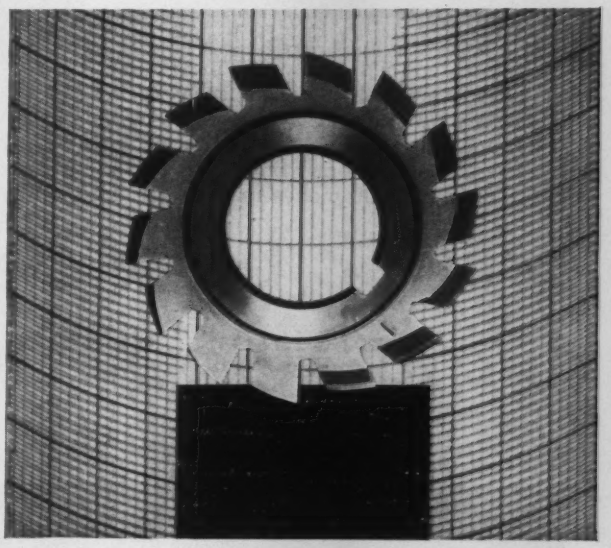
more uniform distribution of sulfides in the free-machining grades. And this provides improved machinability and superior surface finish.

Single-Thread Gear-Hob Tolerances (in Ten Thousandths of an Inch)

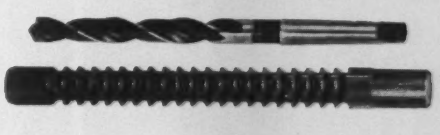
	DIAMETRAL PITCH										
	1 Thru 1.999	2 Thru 2.999	3 Thru 3.999	4 Thru 4.999	5 Thru 5.999	6 Thru 8.999	9 Thru 12.999	13 Thru 19.999	20 Thru 29.999	30 Thru 50.999	51 and Finer
RUNOUT											
Outside Dia. C	50	45	40	25	20	17	17	12	12	10	8

Table: Metal Cutting Tool Handbook

FINAL PROOF OF A HOB'S ACCURACY. *This lead variation chart, produced by a special electronic recorder, provides a check of every tooth in the hob. Checks are made "against perfection" — so, any deviation shows up on the chart. Photomicrograph shows tooth area's structure and the uniform distribution of carbides in Crucible Rex M2S. (Photo: 100X dia.)*



BETTER TOOLS, THROUGH BETTER STEELS. *The constant improvement of Rex High Speed Steels ensures the increasingly greater performance of fine twist drills, taps, broaches and cutters — as well as hobs.*



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William Krause, left, and John Rasp of Westinghouse's Beaver plant inspect laminations delivered by "Flying Press" stacking chute.

Westinghouse blanks silicon laminations at 450 strokes/minute on Wean "gearless" press

The production of "E" and "I" laminations demands equipment with both speed and precision. At the Westinghouse Standard Control Division plant in Beaver, Pa., millions of these stampings are required each month for five models of line starters—yet each must meet final tolerances of .0003".

Westinghouse is getting both high production and tight quality control with its specially designed, coil-fed Wean "Flying Press." This exciting new press design is truly "gearless," the three cranks being synchronized with an "A" frame. The unique die motion of the "Flying Press" permits operation at up to 450 strokes/minute, or 1800 inches/minute strip feed—fully twice the speed attainable with other presses in this service. Other advantages of the Wean "Flying Press" over conventional presses are 40% longer die life, open design that permits fast, easy die changes, safety devices to prevent die damage, and automated handling of the finished pieces.

For a more detailed description of this pacesetting press application, write to Wean for an illustrated article. The new "gearless Flying Press" is typical of the advanced equipment which has earned Wean its leadership in the field of coil processing. Your experienced Wean sales engineer will be glad to tell you how this concept can help *you* cut production costs.

WEAN EQUIPMENT CORPORATION
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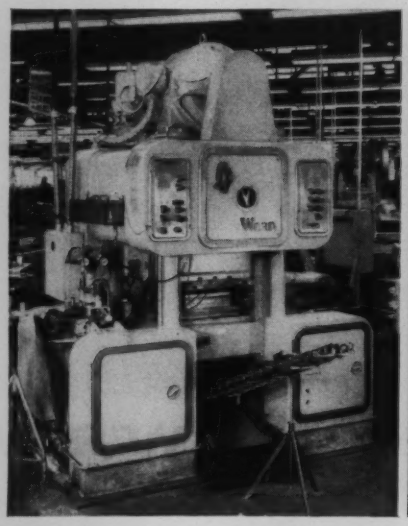
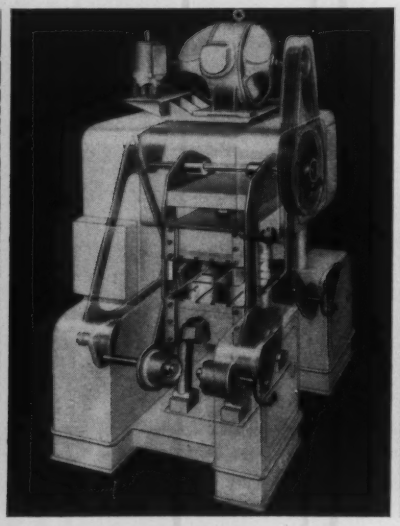
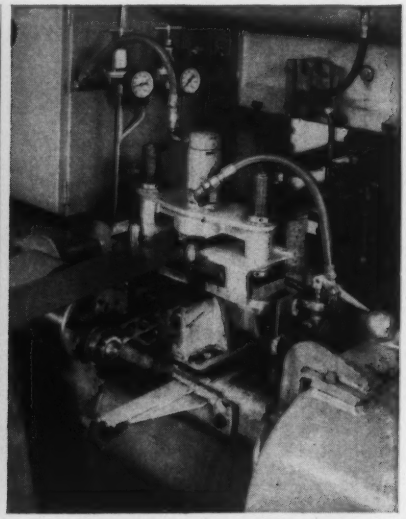
WEAN

Left to right: open design speeds die changes in "Flying Press"; cutaway shows how press cranks are tied together and the relative die motions; pad feed accurately indexes strip.







READY TO GO: Spare bolster, loaded with dies, is ready for fast switch in press. Vern Holmes, master mechanic, points to special adapter plate on top die shoe, which allows automatic clamping to ram.

Moving Bolsters Speed Setting To Boost Press-Line Output

This first moving-bolster press line in U. S. A. forecasts a transformation in press plants.

If it comes even close to goals set for use time, it will obsolete present thinking in many stamping plants.

By R. H. Eshelman,
Machinery Editor

▪ Moving bolsters promise to double productive time on large presses. That's the word from press builders.

They can cite figures to show that on typical stamping and forming jobs, use time runs below 50 pct. It's actually closer to 40 pct. By adding a spare bolster for rapid die-switch, you can get 90 pct uptime, they figure.

And it works out in practice. The first integrated bolster-press line in this country is now at work at GM's Fisher Body Plant No. 1, Grand Rapids. Already plant management can confirm expected substantial gains in uptime.

Product Changes—There's a reason for Fisher Body Div. inaugurating this new concept in press lines. For the answer you have to look first at radical changes that have occurred in car design and production.

Five years ago, GM used three standard, basic bodies: A, B and C. Today this formula has been abandoned.

To meet market demands Fisher Body in 1960 is making some 88 body styles. Few parts are interchangeable. That means many die changes in stamping.

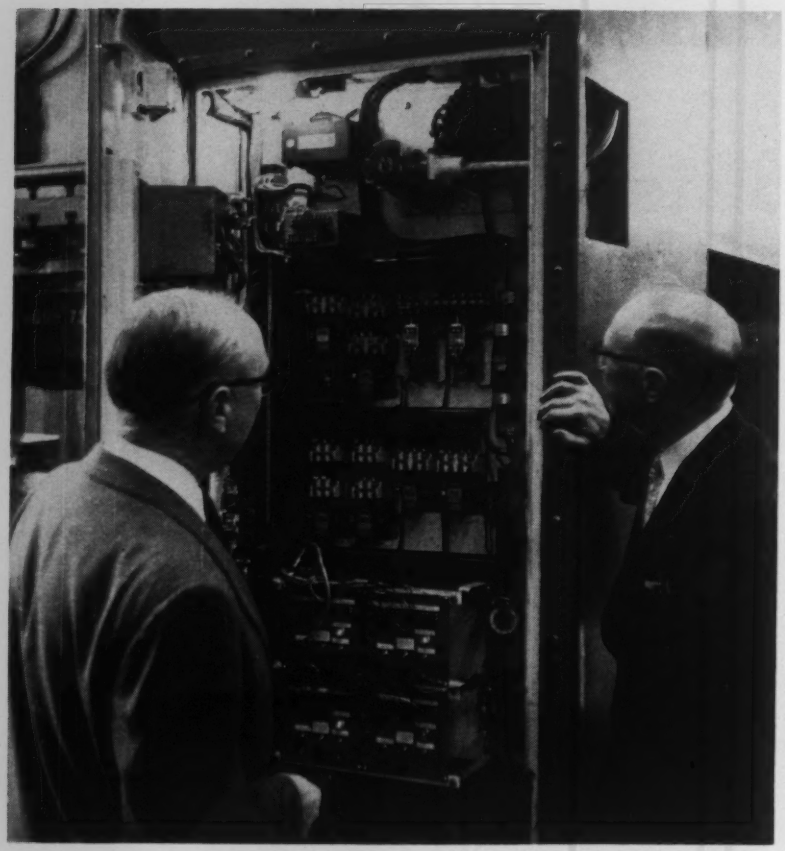
More Production—So plant manager, T. C. Fletcher explains, "Where we anticipate getting the greatest benefits from this type of line is in our changeover. In other words, we have a number of parts that we run with the same equipment.

"This necessitates our changing

from one set of dies to another daily, or oftener. That is where we would get the greatest benefit—in quick tooling change. We will spend more time on actual production, less in switching dies."

With some 1800 production dies in use, you can visualize the scope of the die-change problem. Even with expert scheduling and changing dies on the third (non-production) shift, there's a big headache and substantial loss in maximum capacity, as well as flexibility. That's where the new moving bolster line comes in.

DOWN THE LINE: Operator loads formed part into press for secondary stamping. Conveyor transfers part from previous press.



PUSH-BUTTON CONTROL: Electronic control panel on moving bolster presses has finger-tip control of press ram, positioning of bolsters.

Trial Run—For its initial break-in, master mechanic Vern Holmes scheduled a good test of what the line can do. He is running four front body hinge pillars — that means two pairs of right and lefts.

This is a fairly heavy compound stamping (0.089 in. stock). It forms a portion of the front end of the car, supporting the front door.

To make this part you need several draw operations, piercing, flanging and trimming. This job is well-suited to the integrated, eight-press line.

In-Line Setup—First in line is the heaviest press. It's an 800-ton Clearing toggle press, with an inner slide and an outer slide for making heavy, deep draws.

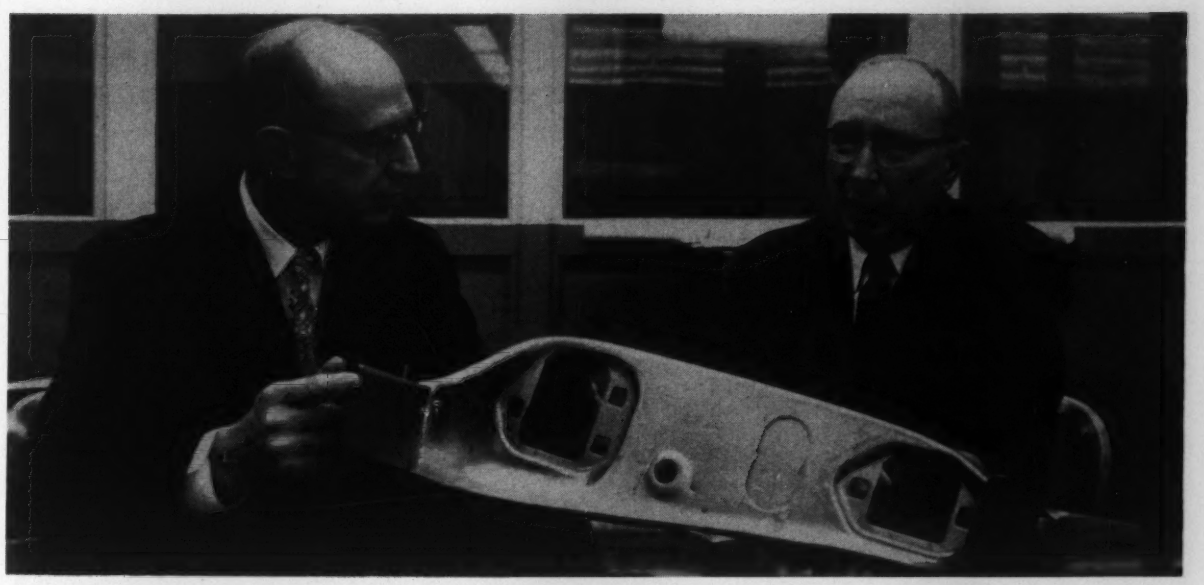
Next is an 800-ton Bliss spank press. Following that are six 400-ton Clearing air-cushion presses for secondary operations. All on the line are straight open-side with movable bolsters. Each is equipped with a spare bolster for loading during production.

The line is tied together with power conveyors. Die kickouts or mechanical hands unload the parts, but positioning of workpieces in the dies is manual.

Special Features—For some time Fisher Body has been working on fast die-change methods and automatic die clamping, according to Carl Pearson, engineer-in-charge, machinery and equipment department.

This line has it throughout. Die clamps are push-button controlled in seconds after the die bed is positioned.

With the moving bolster die loading is a simple matter. Interlocks prevent the operator from driving one bolster into the other, or from actuating the bolster drive



TOUGH PART: Front body hinge pillar with flanges top and bottom makes a tough tooling problem. Plant manager T. C. Fletcher (left) and Vern Holmes talk over bolster setup.

motors when the press ram is down.

Within Thousandths — Another big improvement, particularly helpful for die tryout, as well as in tooling changeover, is the automatic ram positioner. This arrangement controls ram position electronically to any desired shut height within a couple of thousandths. The operator merely sets dials and pushes the button.

There are other safety features, too. For instance strain gages give a readout of loads and overloading.

There's a safety cutoff, too. If you overload the press, the hydraulic overload relieves the press and shuts it off. The slide must then be backed off bottom, hydraulic overloads reset and the die condition corrected before operation continues.

How It Works—Once the presses have been set up, the actual operation is typical for this type of part. For the front body hinge pillar, flat sheet is sheared to the size and shape of the developed blank. This goes to the first press for the major drawing operation.

In the second press, a spank operation brings the part to basic form. Succeeding trim operations remove the flashing.

As the part moves down through the other presses, they add a fold, pierce a number of holes. Also they flange down one side of the panel, and in the last press, form another flange on the opposite side.

Quick Switch—While the line is running one part, die setters are busy setting up the next run on the spare bolsters at the side of each press. Working outside the press affords many advantages in the shop. Not the least of these is the greater safety.

With this arrangement it's possible for a crew to set up the next run with less time wasted waiting for crane handling of dies, etc. Then for the actual change, Vern Holmes explains: "With the tools already set up, we automatically unclamp the dies in the presses, slide the bolster out the opposite end of each. Then the spare bolster with the preset die slides in through the column. As the operator runs the ram down to the proper shut height, the dies are automatically clamped.

"Then we should be back in production on the new part in six or seven minutes." Making this change manually, on a conventional line, would require several hours of downtime.

Better Tryout—Another big factor, Fisher equipment engineers note is die tryout. "A major tryout program for next year's parts during the volume production of current models has always been a headache," Carl Pearson says. "It can cause a bottleneck in tooling if press capacity is not available."

He's sure the moving bolster will help solve this problem. You can set up the new dies on the spare bolster and get your tryout hits made on non-productive time.

Looking at potential of the moving-bolster concept, Mr. Fletcher feels it may have even more to offer smaller stamping plants. "The greatest advantage of a sliding bolster press," he explains, "is to be had in running as many different parts in it as you can. And that's why a plant that has a smaller volume but many different tools will get the most advantage out of this idea."

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EASY SETUP: Operator positions arc torch, mounted on stand, to remove temporary weld and prepare seam.

Arc Torch Prepares Tank Seams

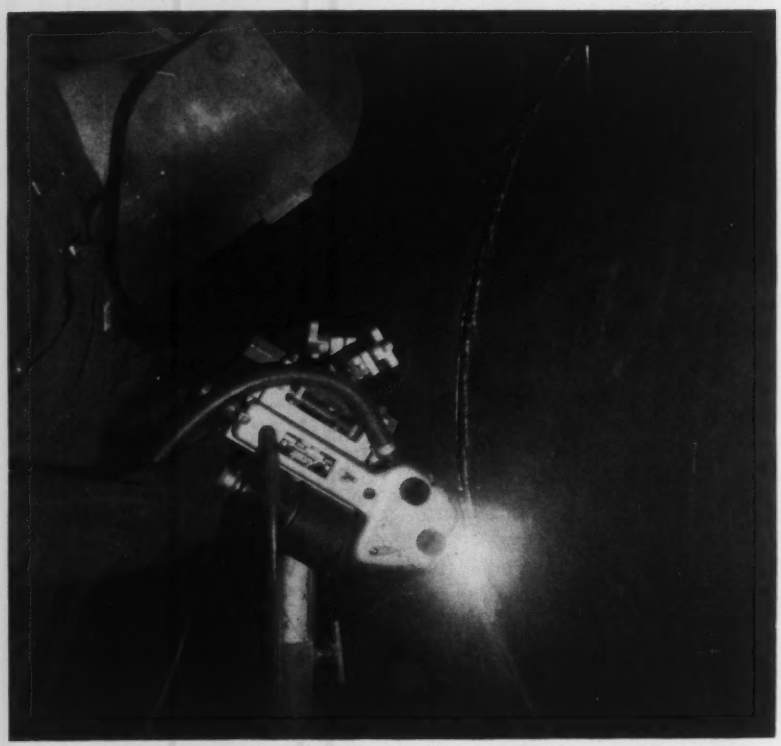
By eliminating pre-beveling in welding tank seams, a new method simplifies fabrication.

Square-edged parts are fitted together and the process takes over from there.

▪ Instead of pre-beveling sections of metal for welding, a tank fabricator is using a new technique. Key to the method is the use of an automatic gouging torch.

To prepare circumferential seams for welding, the company, Sistersville Tank Works, Inc., Sistersville, W. Va., now fits the square-edged parts together. A manual weld on the exterior of the tank joins the edges temporarily.

Start on Inside—The vessel is then permanently welded on the inside with the submerged-arc welding process. Next, with the tank mounted on rolls, the automatic gouging torch, a model Q-3 unit



ADJUST FOR DEPTH: Operator adjusts electrode feed controls to synchronize torch with turning rate of rolls for depth of gouge desired.

made by Arcair Co., Lancaster, O., is used to remove the temporary outside weld and form a U-shaped groove.

The operator can set the depth of the U-groove. He establishes it with the electrode feed adjusting knob when sound metal is reached at the root of the interior weld.

Operation of the torch is simple. A consumble special carbon graphite electrode feeds toward the seam at a pre-determined rate. It's in conjunction with the turning rate of the moving tank for the depth of gouge desired.

Simple Needs — The Arcair torch's only auxiliary requirements are power from a welding machine and a supply of ordinary compressed air. At Sistersville, the torch operates from a 400-amp Lincoln motor-generator unit set at about 325 amp, and 90-psi compressed air from the shop air line.

Both the air and the current are piped to the torch through a single concentric cable. Current from the welding machine is positive, the work being negative.

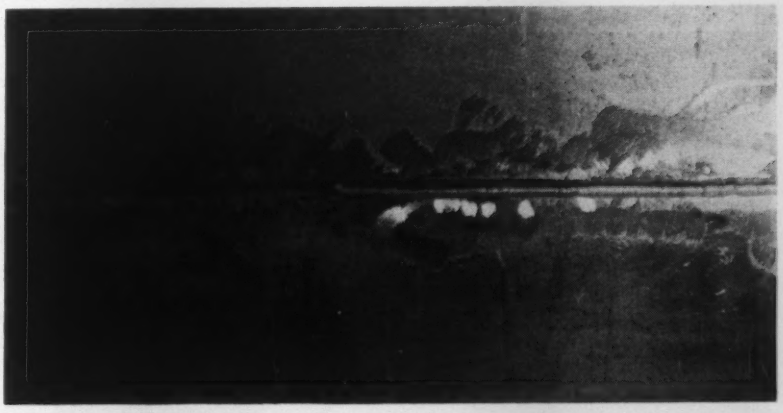
On bringing the electrode of the torch close to the work, an electric arc forms, and heat from the arc melts the metal. Simultaneously jets of compressed air from the torch head blow the metal away.

Time Savings—Continuous melting and removal of metal produces a clean uniform groove in a mere fraction of the time required to do this work by other methods, such as using pneumatic chipping tools, manual grinding, or oxy-acetylene cutting.

Another advantage is that the method can be used on any type metal. Also the process has very low heat input—only about 150°F per pass. That's so low that you can place your hand on a gouge immediately after it's made.

At the Sistersville setup, the automatic torch is mounted on a pedestal beside the tanks. As the tank revolves past the torch, the bright clean groove replaces the manually deposited weld metal in the seam.

FAST CYCLE: In a matter of minutes the job is almost completed. The longitudinal seam is prepared by a manually operated gouging torch.



READY FOR WELDING: Because metal is not burned during removal operation no grinding is needed in gouged area itself. Only a cursury grinding clean-up was required to finish off the surface area.

Full Penetration—After a light grinding, the groove is then re-welded with automatic equipment to attain 100-pct penetration. The cost of the electrode to prepare a 55½-in. diam seam is less than $1.00. The time involved is less than five minutes.

Ease of operation is still another feature. Any welder can learn to use the equipment in a short time.

A hand model torch does the job for longitudinal seam preparation. The manual unit is also used for removing defects and cutting stainless steel.

Both torches gouge at speeds up to 30 ipm. Among the advantages of the automatic unit are uniformity of depth and straightness of the cut or gouge, because the tool is held stationary.

Pressure Treatment Up-Grades Teeming Ladle Nozzles

By G. M. Carvlin, Jr.—Refractory Engineer, Koppers Co., Inc., Pittsburgh

Erosion and failure of refractory nozzles have long been a problem during casting.

Recent production line experience shows that pressure impregnation of nozzles can result in steel improvement equal to 2-8¢ per ton.

▪ Open hearth and electric furnaces may lose a significant percentage of their capacity due to the failure of refractory nozzles in teeming ladles. This loss, which can add as much as 2-8¢ per ton to the cost of steel, has always been a problem of the industry.

Deterioration of the teeming ladle nozzle is a weak point in the pouring of the heat—especially where alloy steels are concerned. The nozzle is subject to heat shock; and the flow of metal through the nozzle bore erodes the wall causing a two-fold problem.

It washes the refractory into the ingot causing reduction in the quality of the steel; and it increases the rate of flow which is undesirable in high alloy steel ingots. Also, the stopper head tends to stick in the nozzle seat and when it is pulled or burned free, the seat is often damaged.

STEADY METAL STREAM: Treated nozzle permits a steady, controlled pour. In shut-off, icicles, droppers, runners, and leakers are reduced.

Finds an Answer — Much has been done in an effort to find ways to overcome these weaknesses. But no remedy was found until some years ago; it was discovered that boiling the nozzle in anhydrous tar improves its performance somewhat.

The boiling process, however, did not consistently provide uniform penetration or retention of the tar within the nozzle walls. Nonuniformity of penetration and retention often results in weak spots set up within the nozzle; hence resistance to both thermal shock and erosion lessens.

This primitive treatment was time consuming, too. Tar could be used for only a short time before it became too viscous to penetrate properly. Odors given off by the hot tar bath were objectionable. Handling costs were excessive. Considerable time and labor were expended removing excess surface accumulations, and making certain that the bore of the nozzle was clean.

Tar Does the Job—But boiling ladle nozzles in tar proved effective when penetration was complete and tar retention adequate. Thus, a few engineers in the steel industry looked around for possible alternate answers to the problem of making tar distribution throughout the nozzle walls both complete and uniform.

In 1954, this investigation led to Koppers Company, Inc.—producer of pressure-treated products since the early 1900's and a known authority on the pressure-impregation of many types of materials.

Teaming-up of Koppers know-how and resources, and the refractory experience of the metallurgical engineers resulted in: treatment of nozzle under vacuum and high pressure with a pre-heated carbonaceous impregnant.

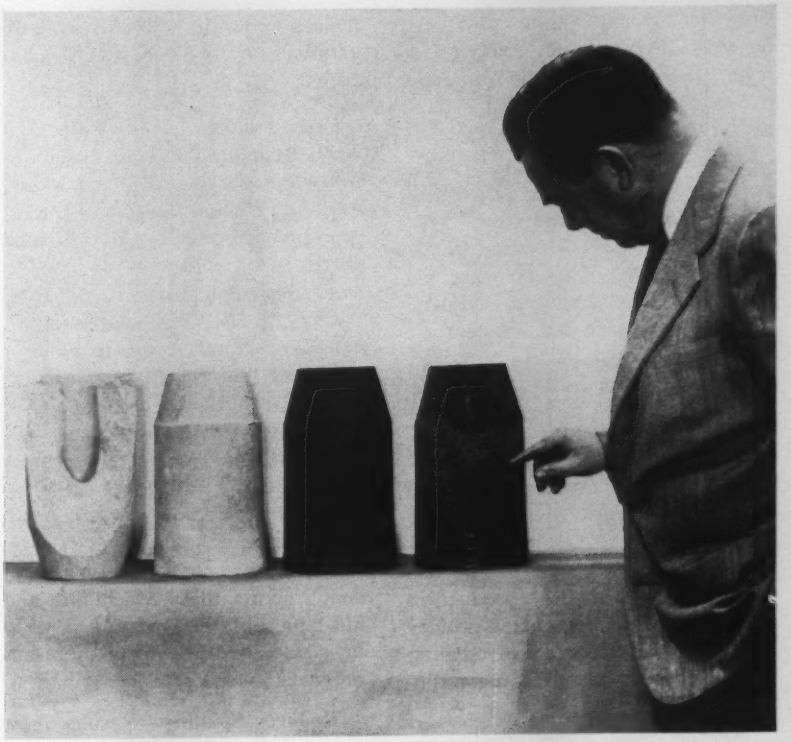
Uses Vacuum — How does the pressure - impregnating process work? The treatment is performed in an autoclave able to handle up to 5000 nozzles. Raw nozzles are stacked onto tram cars. The loaded cars are pushed into a 90-ft long autoclave which is then sealed to form an air-tight chamber. A vacuum cycle evacuates air and moisture from the pores of the nozzles.

Tar, pre-heated to elevated temperatures, fills the autoclave while the vacuum is held. Once the autoclave is "charged" with the hot tar solution, air pressure forces the solution into and through the nozzles. The amount of pressure and the length of the pressure cycle depend on the porosity and density of the nozzles.

After the pressure cycle, the cylinder is evacuated. The treated nozzles are then exposed to superheated steam under pressure to clean the outer surfaces and inner bores. The cylinder door is removed; the clean, dry nozzles are ready for use.

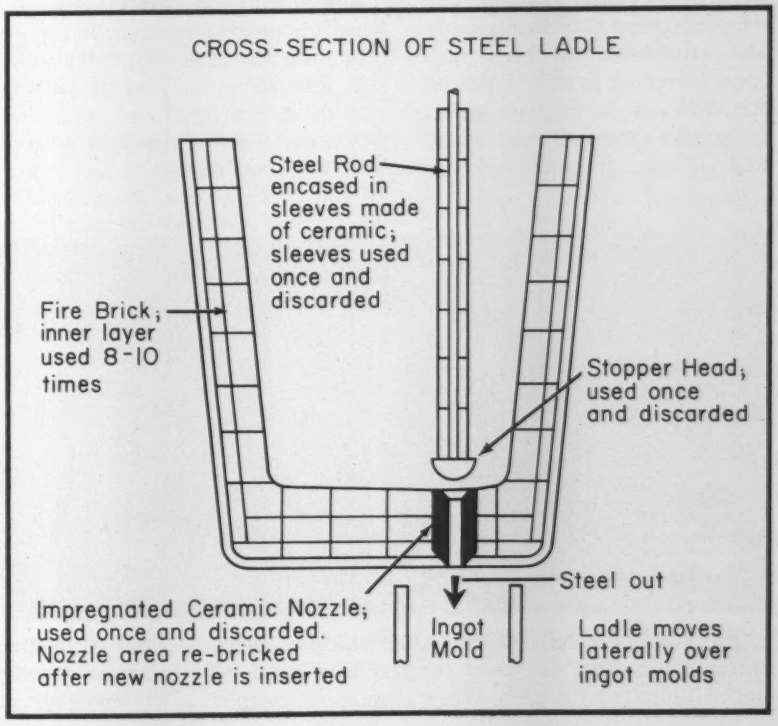
Reduces Erosion — During the past six years extensive use of pressure - impregnated nozzles by certain key steel producers establishes that, in most cases, pressure impregnation of nozzles, reduces bore erosion and eliminates spalling.

At the Timken Company's Steel and Tube Div., teeming ladles are equipped with pressure-impregnated nozzles. Control records show that impregnated nozzles give a



PENETRATES EVENLY: Cross-sections show that pressure-impregnated nozzles have complete, even penetration throughout entire refractory. In extensive use, these nozzles exhibit reduced bore erosion and spalling.

Treated Nozzle Cuts Erosion


CROSS-SECTION OF STEEL LADLE
Steel Rod encased in sleeves made of ceramic; sleeves used once and discarded
Fire Brick; inner layer used 8-10 times
Stopper Head; used once and discarded
Steel out
Impregnated Ceramic Nozzle; used once and discarded. Nozzle area re-bricked after new nozzle is inserted
Ingot Mold
Ladle moves laterally over ingot molds

smoother stream contour and better controlled rate of pour. As a result, there is less metal contamination due to bore erosion and nozzle failure.

"At the Timken Company, impregnated nozzles result in cleaner shut offs and improved steel," says Mr. H. F. Walther, electric-furnace superintendent. The pouring pit foreman, Tony Capuano, reports, "Pressure impregnated nozzles just about eliminate icicles, runners, leakers and drippers."

How About Quality?—A recent large-scale production test at Crucible Steel Company's Midland, Pa., works showed improvement in the quality of ingots poured through treated nozzles. William Kollmann, superintendent of steel production says, "Pressure-impregnated nozzles give us a higher control of teeming which leads to improved ingot surface quality."

Another steel maker running actual production tests in teeming ladles equipped with impregnated nozzles, notes an improvement in steel quality equal to 2-8¢ per ton; this is based on the reduction in croppage and scarfing necessary before processing.

Savings were due mainly to less bore erosion—thus, fewer inclusions within the ingots. What erosion did occur in the bore walls of the nozzles was uniformly distributed along the circumference. Hence, pouring streams were smoother and more easily controlled.

Less Failures — At Pittsburgh Steel Foundry Co., open hearth ladles for pouring cast armor and specialty steel castings were equipped with pressure-impregnated nozzles. Refractory wash due to metal flow and nozzle failure from thermal shock was almost eliminated; a smoother stream contour improved pouring control; stickers and leakers became negligible.

Says chief metallurgist, Dr. R. W. Zillmann, "We get consistently higher quality castings with pressure-impregnated nozzles than we did with untreated nozzles." Lou Hovart, open hearth superintendent, reports that "Machining and finishing costs are reduced in castings poured through pressure-impregnated nozzles."

Reduces Spalling—Results show that pitch impregnation so decreases the temperature gradient through the nozzle wall that there is much less tendency to thermal shock spalling.

Gases evolved from the pitch during pouring may act as a lubricant to reduce erosion. At any rate, pitch impregnation results in a more uniform rate of flow from the ladle. It also serves to prevent sticking of the stopper head and the formation of "chills" which tend to form on untreated nozzles.

Slag attack causes erosion in untreated nozzles. But slag does not wet the pressure-impregnated nozzles to the same extent; thus erosion is reduced. The treatment does not completely prevent erosion of the nozzle bore. Instead, it controls erosion. Experience shows that the treatment reduces erosion 50-75 pct.

Field is Wide Open—It is apparent that the field offers many instances where pressure-impregnation might be used to advantage. The porous nature of refractories offers specific cases in which pressure-impregnation might increase the density, reduce the permeability and improve such properties as thermal conductivity, modulus of rupture, cold crushing strength, etc.

Koppers is now conducting research along this line as well as in the realm of ferrous and non-ferrous production, and impregnation of fire clay brick for exposure to chemicals.

In short, it is believed that the surface has barely been scratched in the treatment of refractories by pressure-impregnation.

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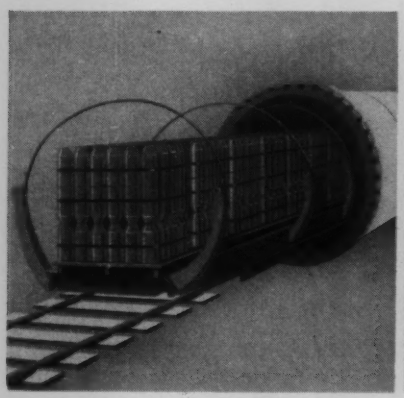
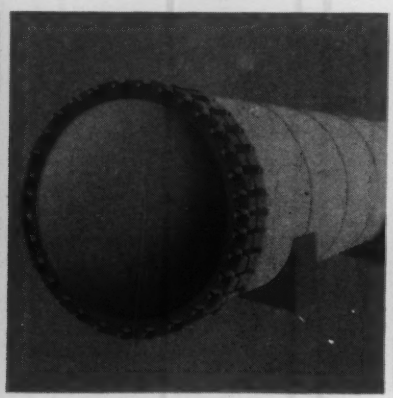
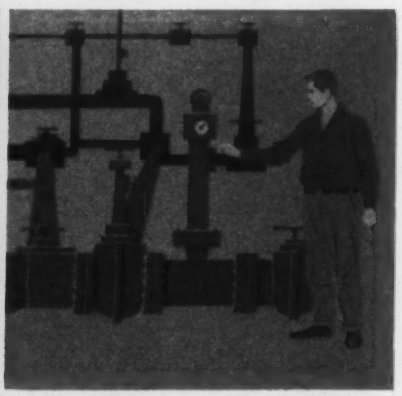
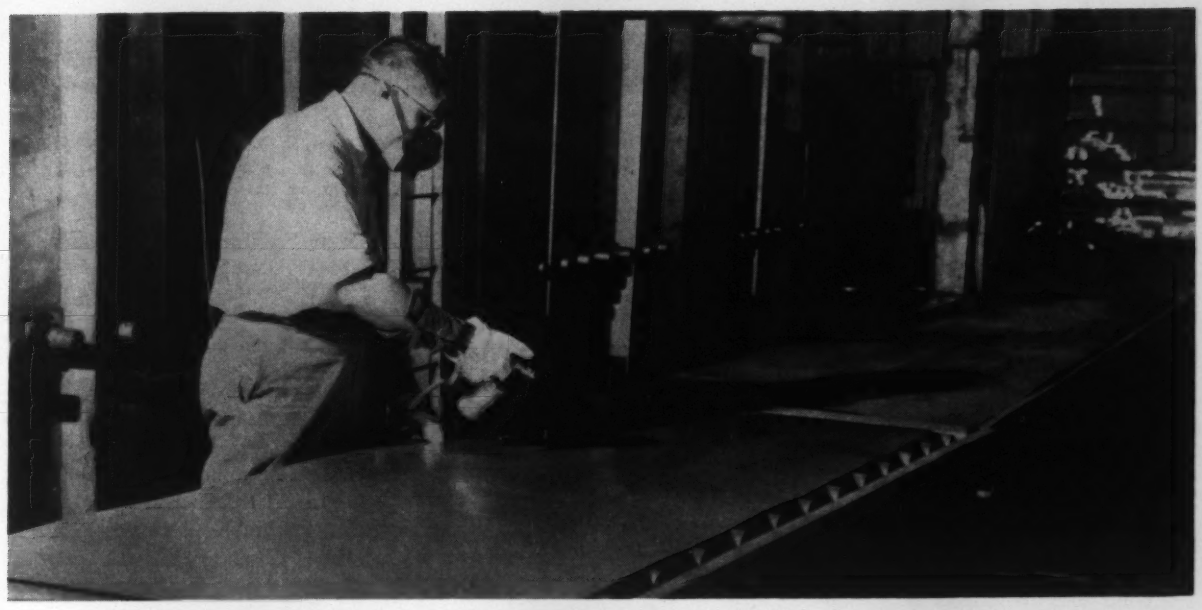






IMPREGNATES NOZZLES: After charging (left), operator evacuates autoclave (center) to remove air and moisture from nozzles. When chamber is pumped full of treating material, he breaks the vacuum, and applies pressure (right) to aid impregnation. After cleaning and drying, nozzles are ready for shipment.



PROTECTS SHEET: Before heat treating, operator precoats titanium sheet to cut down oxidation.

Titanium Sheet Gets Heat-Treat

New heat-treat process for titanium makes possible high-strength, light-gage sheets.

It will mean engineering advantages to the aircraft and missile designer.

■ Development of a new heat-treating process for titanium sheet alloy offers new engineering advantages to the aircraft and missiles industries. It means that the alloy sheet can be used in thinner gages—and, therefore, lighter weight—while still meeting required strengths.

Identified as Type RS-410, the titanium alloy contains 5 pct Al, 1.25 pct Fe, and 2.75 pct Cr. Commercially available from Alloy Steel Div., Republic Steel Corp., Massilon, O., the heat-treated alloy has strengths greater than 190,000 psi.

The new process for heat treating large titanium sheets makes it possible to produce sheet free of surface contamination. Moreover, the alloy has improved properties. Though developed mainly for RS-410, the new process may be used for other heat treatable alloys as well.

Need Proper Alloys—According to Republic Steel's titanium metallurgists, one of the shortcomings in the past has been the lack of suitable titanium alloys which were capable of being heat treated to high strength levels.

But, the commercial availability of heat treated titanium alloy sheet, it is stated, will provide the aircraft designer with a material having a strength to weight ratio greater than any other material now used in aircraft construction.

For the new process, Republic Steel uses a five-zone, electrically-heated, continuous roller-hearth furnace; it is especially adapted to deliver uniformly-heated sheets directly into a continuous roller-quenching unit.

Takes Precoating — The sheets are first precoated to prevent contamination by atmospheric gases; they are then heated for short periods at 1400°-1700°F—depending upon the alloy grade. This is followed by water quenching in a continuous roller-quenching unit.

After treatment, the sheets are in the soft condition, and may be either hot or cold formed. They are then "aged" for several hours between 900°-1000°F to produce high strength levels.

Or, if desired, the sheets may be aged at the mill after solution treating, then shipped in that condition. Applications for this material are where only moderate forming is required, but where high strength is necessary in the final part.

Republic Steel indicates that there are other programs which on successful completion will also add to the usefulness of titanium in aircraft and missile applications.

Add Columbium to Killed Steel To Retard Grain Growth

By E. E. Fletcher and A. R. Elsea—Battelle Memorial Institute, Columbus, O.

Recent studies point up the effect of columbium in retarding grain growth in killed steels.

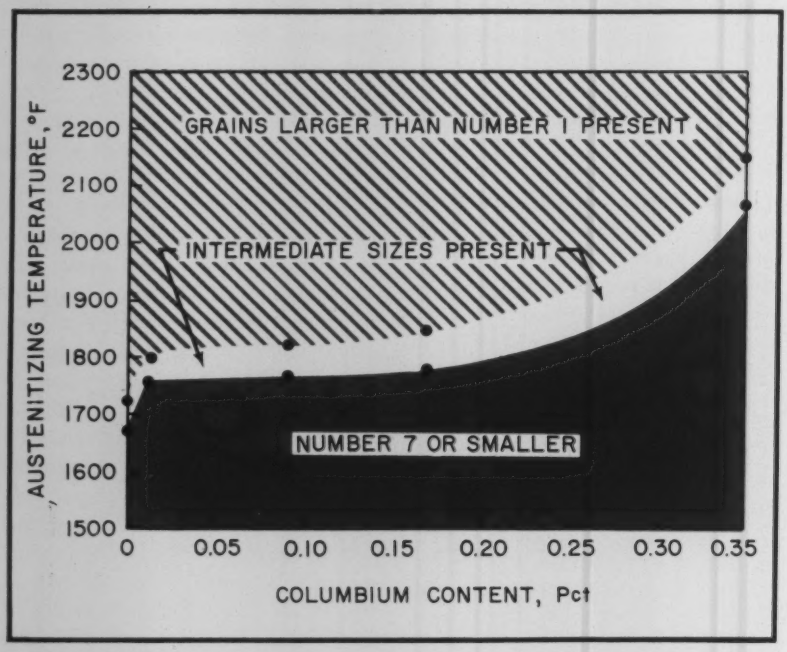
Tests also show that small amounts of columbium increase the yield strength without a loss in ductility.

■ What are the effects of columbium on killed, heat-treatable steels? This question was put to a research group at Battelle Memorial Institute, Columbus, O., not too long ago. Some answers are now available.

Among the results of the study sponsored by Kennecott Copper Corp., New York: columbium imparts a strong resistance to grain growth—even in steel killed with 2 lb per ton of aluminum; small amounts increase the yield strength of this killed, heat treating grade by as much as 8200 psi.

Of the four columbium levels studied, an addition of about ½ lb per ton gives the best mechanical properties. However, if the steelmaker wants extra resistance to grain growth, he may obtain it by a columbium addition of about 8-9 lb per ton.

Helps Steel Keep Small Grains



HOLDS BACK GROWTH: Tests run at temperatures between 1575° and 2300°F show that aluminum-killed steel has a fine grain size even when austenitized at 2000°F; adding 0.35 pct columbium does the job. Even 0.012 pct columbium raises grain-coarsening temperature by about 100°F.

Small Additions — The steel selected for the study was a wrought, aluminum-killed, SAE 1035 steel to which these additions of columbium were made: 0.012, 0.09, 0.17, and 0.35 pct. A control heat, with no columbium, was also prepared.

Ingots from the various heats were forged into square bar stock. This as-forged stock reveals pearlite patches which vary in size considerably; they decrease in size with increasing columbium content. Also, all four columbium steels show finer grains than does the control steel.

Studies Four Areas—A study of the effects of columbium on the response to heat treatment includes effects on the austenite grain size, solution of carbides, hardenability, and tempering.

The first chart shows the effect of the columbium content on steel grain size as produced by austenitizing at various temperatures. Note that 0.35 pct columbium imparts a powerful resistance to grain growth: this results in a fine grain size even when the steel is austenitized at 2000°F.

Although smaller columbium additions are less effective in retarding grain growth of this aluminum-killed steel, even 0.012 pct columbium raises the grain-coarsening temperature of the steel by about 100°F.

Carbides Hold Up—The columbium carbide present was very hard to dissolve. Only in the steel with the lowest columbium content,

were the carbides in solution after a treatment of 1 hour at 1850°F. In the three steels of higher columbium content, much of the carbide remains undissolved after 1 hour at 2300°F.

After treatment at the higher temperatures, fewer carbides were present than in the as-normalized material; but the average particle size was much larger.

For austenitizing temperatures below the grain coarsening temperature, increasing the columbium content somewhat reduces the hardenability. At higher austenitizing temperatures the hardenability increases with increasing grain size as would be expected.

The four columbium steels resist softening when tempered at temperatures above about 950° or 1000°F. And, when tempered in this range, all four were harder by about 3 Rc than was the control steel.

A study of various tempering times at the higher temperatures shows that secondary hardening is only minor in the columbium steels.

Raises Yield Strength — Adding 0.012 pct columbium raises the yield strength of the normalized steel by 3400 psi, and of material quenched and tempered at various temperatures by 4100-8200 psi.

The second chart shows that the effect on the tensile strength is slightly less. The alloy achieves this strengthening without loss in elongation or reduction in area.

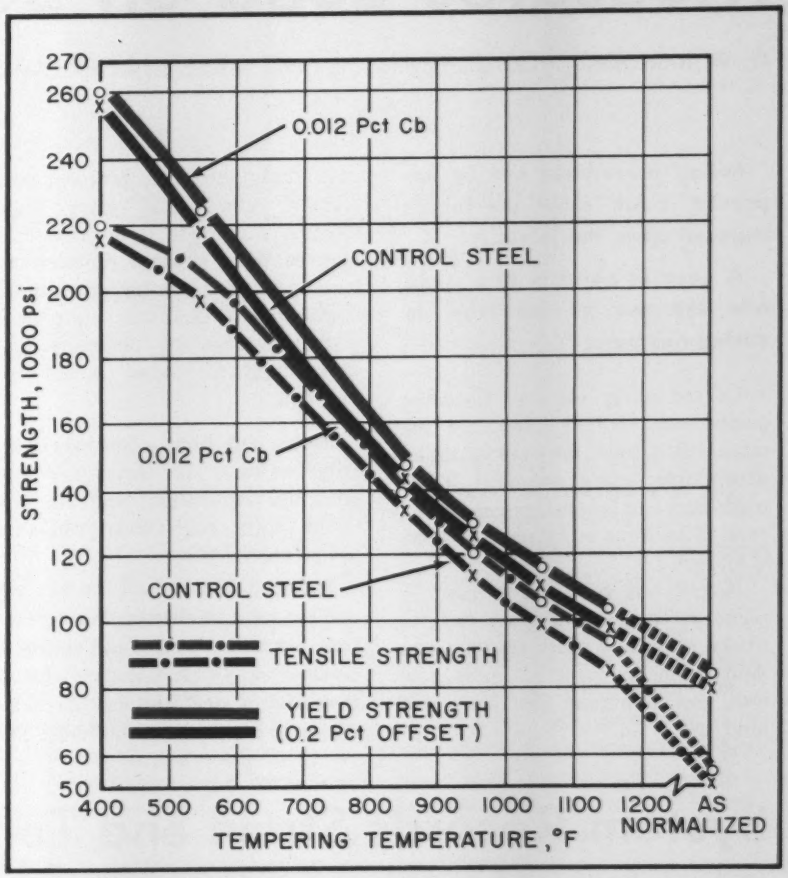
In nearly all instances, strengths of steels with 0.09 pct or more columbium were lower than that achieved with this small addition of 0.012 pct.

Columbium has little effect on the impact-transition temperature for the steel in the as-normalized condition (about 70°F) or for material hardened and tempered at 1150°F (about –80°F).

Alter Transition Point—Columbium additions lower the transition temperature of steel tempered at low temperatures (400° and 550°F). Larger columbium additions are more effective, but it seems they have the opposite effect when one tempers these steels at the intermediate temperature of 850°F.

Comparison of material water-quenched after tempering at 1150°F with material furnace-cooled after tempering reveals that the steels with 0.09 pct or less columbium show a small degree of temper brittleness. However, the steels with larger columbium additions are free from temper brittleness.

Columbium Boosts Strengths



INCREASES PROPERTIES: Adding 0.012 pct columbium raises both yield and tensile strength without loss in elongation or reduction in area.

Aluminum-Killed SAE 1035 Steel

Typical Analysis, pct	
C	0.33
Mn	0.67
Si	0.19
P	0.027
S	0.028
Al	2 lb added/ton

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Measures Load on Bolted Joint

By W. Bratkowski—Materials Engineering Dept., Westinghouse Electric Corp., East Pittsburgh

Bolted assemblies can be improved if we know the forces imposed upon the joints.

A case in point is this study into the use of aluminum in bolted bus bars.

▪ Of the many ways of fastening components, bolted joints are the most widely used; they are versatile, dependable, and economical. Their usefulness can be even greater, however, if the force maintained by bolts is known.

Bolted bus bars are a case in point. Recently, aluminum has replaced copper in these components. And engineers want to know how well the aluminum bus bars will hold up.

A study into this problem was recently completed, using high strength aluminum. It shows aluminum to be a suitable replacement for copper; and, perhaps even more important, it describes equipment and techniques for obtaining like information for other bolted assemblies.

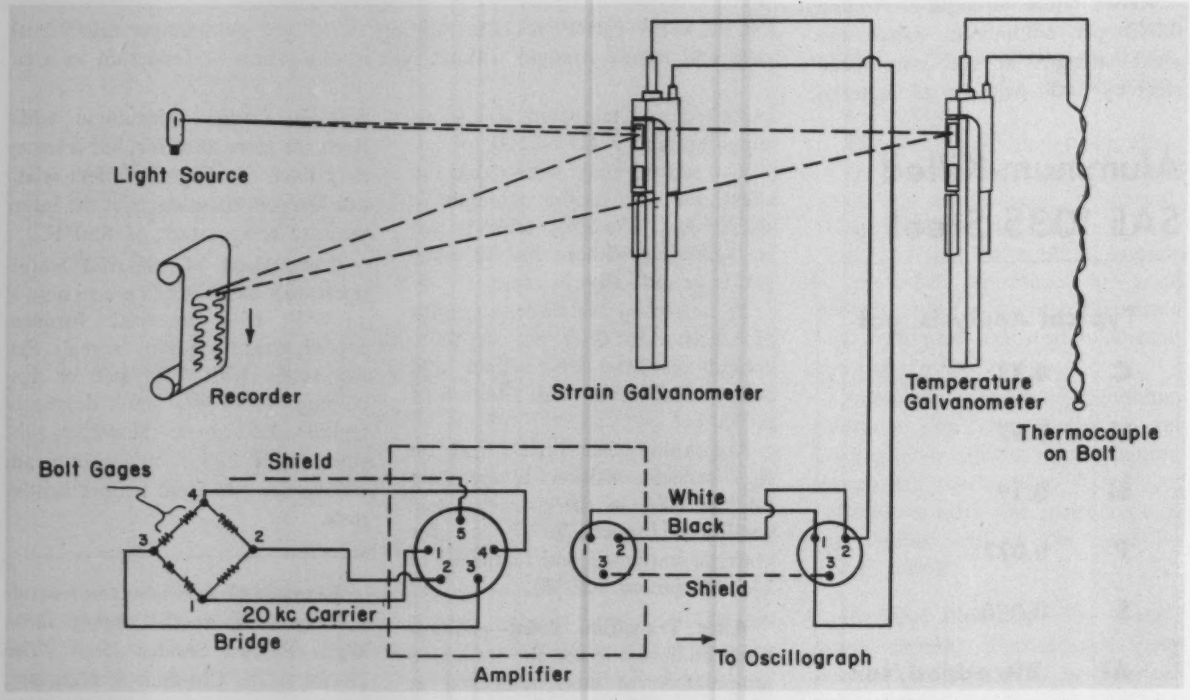
Fasten with Bolts—Bus bars carry large currents in switchgear and generator equipment, and are fastened with steel bolts wherever joints are needed.

Short circuits subject the bus bar and the joint to changes in temperature. Since the thermal and electrical conductivity of aluminum is greater than that of steel, the bus bar heats up more rapidly than the bolts. The two metals also differ in thermal expansion and modulus of elasticity. Thus, when the bus bar experiences a short circuit, these property differences combine to impose a compressive force on it.

When a short circuit occurs, each bus bar is subjected to the same current. However, when joints are connected in series, the reaction of one joint may affect the other joints' behavior. Thus, all joints were tested in each position to remove any possible variables.

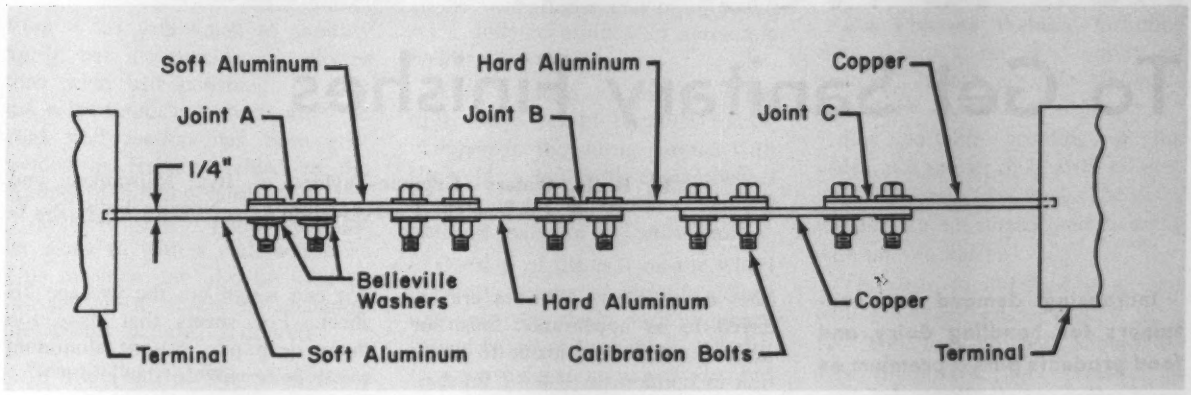
Record the Stretch—During the short circuit test, each bolt was subjected to a change in temperature, externally applied load, and magnetic field. Two wire strain gages and a thermocouple, fastened to

System Records Strain and Temperature



NOTES TEST DATA: Recorder simultaneously notes temperature change and bolt strain after short circuit.

Electrical Setup Tests Bolts in Series



each bolt, record the stretch to the bolt due to these changes.

Strong magnetic fields are generated during the short circuit, to which the strain gages are subjected. Since these fields can change the gage resistance and induce voltages in the gages, they could mistakenly be interpreted as strain. To avoid this condition, advance-type wire resistance gages were used.

Another effect is experienced when a magnetic field collapses through the gage. A voltage is generated in the gages, which may also be interpreted as a strain. However, proper wiring and gage placement compensates for this effect.

Two flat and parallel surfaces were machined on the bolt body. At assembly, the bolts were positioned so that the magnetic field, generated in the bus bar, collapsed about the edge of the gage and not through the grid. This test arrangement lessens the effects of the induced voltage.

Make Calibration Curves—Calibration on curves of thermal strain vs. temperature and load vs. strain were determined for all of the joint bolts so that the actual load on the bus bar joint could be evaluated.

Test procedure calls for recording the bolt strain and temperature at the same time. Using the calibration curves, the strain values taken from the oscillograph are converted to bolt load.

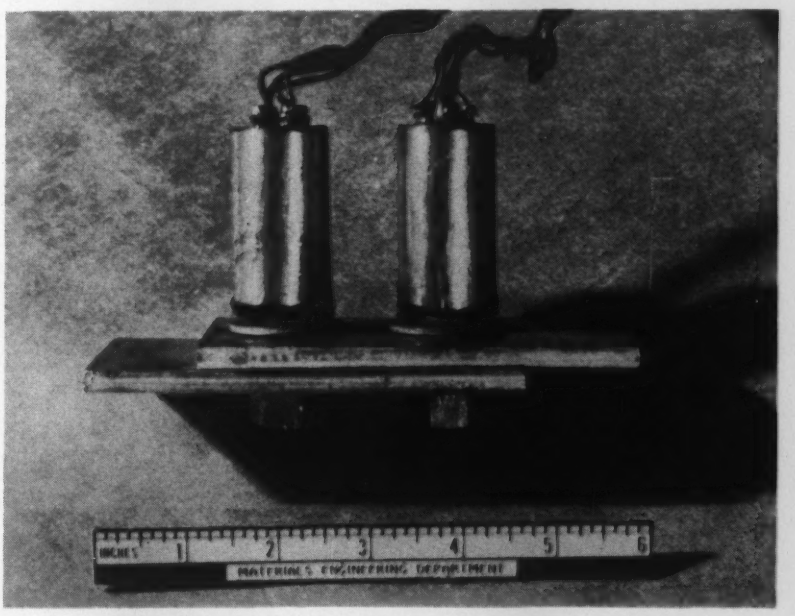
The bus bar bolts were tightened in position with a 50 ft-lb torque. This torque produced an initial load on the joint. The value of this initial load was determined from calibration curves of bolt torque vs. bolt load.

Measure Torques Also — Bolt temperature and strain were measured before, during, and after test run under short circuit conditions of 62,000, 72,000 and 78,000 amperes rms. Loosening torques were also measured after the tests.

The original load induced in each bolt by a tightening torque of 50 ft-lb was 3812 lb. The maximum total bolt load measured in any of the tests was 5712 lb.

What are the findings? There was no relaxation of the initial bolt load. Short circuit tests did not produce yielding of the bus bar material. All joints appeared to be adequate without the special Belleville washers.

The study also shows that bolts, with strain gages bonded to them, make good sensing elements for determining the loads in bolted joints, under both static and dynamic conditions.



TESTS JOINT: Cap over bolt head of typical aluminum joint is thermocouple shield. Strain gages are also attached to bolt before testing.

How to Work with Stainless To Get Sanitary Finishes

By **R. H. Waters**—Engman-Taylor Co., Inc., Milwaukee, and
W. A. Corse—The Carborundum Co., Niagara Falls, N. Y.

Increasing demand for containers for handling dairy and food products puts a premium on production of sanitary finishes.

A few hints on processing can aid in grinding and polishing stainless tanks.

■ The past few years has seen a new industry start from the use of polished stainless steel for handling of dairy and food products. Variations in standards from state to state and from mill to mill have led to wide differences in finished products.

While there are no hard and fast rules regarding production, a guide is helpful in producing sanitary finishes on stainless. Finishes are referred to as appearance finish or sanitary contact finish due to variation in opinion on #4-#7 finishes.

Belt Polishing—Sheet polishing is done on belt-polishing machines. These "wide belt" sheet polishers use belts wider than the sheet being polished.

Hydraulic reciprocating tables have been used to support the sheet during polishing. More recently, pinch-roll through-feed machines have been installed in some plants.

Sheet polishers can handle sheets up to 72 in. wide. Generally, the following abrasive belt grit sequence is used to produce a sanitary finish from a 2B sheet.

Aluminum oxide belts with 80-grit can rough out the average 2B sheet. For sheets that have too many deep pits, 60-grit aluminum oxide belts will do the job.

Limits on Coarseness—Coarser belts are very rarely used because it's too difficult to remove the coarser grit lines. Such lines often show up after the sheet is finished and cleaned ready for use.

A semi-finish pass is next, using a 100-grit aluminum oxide belt. This belt may be used following either the 60- or 80-grit belt.

Next for an appearance finish, use a 120-grit silicon carbide belt. Finally for a finish for food or dairy contact, a 150-grit silicon carbide belt will do the job.

Aluminum oxide belts can be used on the 120 and 150 grit, but will leave a white appearing sheet. Silicon carbide belts leave a bluish cast, common to the dairy and food handling stainless equipment.

Oil Helps—Oil is used in sheet polishing. It's generally applied to the sheet and picked up by the belt.

It's advisable to make several dry passes with a new belt before applying oil to break the belt in and produce a more uniform finish. Too much oil on the belt causes short belt life and brown discolorization in the sheets.

Another effective machine is the automatic stroke sander. This unit uses a 6-in. wide belt brought into contact with the work by a contact buff or a shoe.

Good for Refinishing—The contact buff or shoe moves automatically back and forth on a rail. Pressure applied to the rail is transmitted to work pressure on the abrasive belt. It can be pneumatic pressure

NEED STANDARDS: While there are no hard and fast rules, standard procedures help in achieving uniform quality in sanitary finishes.

for flat work or hand pressure for uneven surfaces.

This method can finish sheets from a 2B mill finish to sanitary finish, but it's considerably slower than wide belt polishing. Its best use is for refinishing sheets after the cold wall section has been spot welded or Heliarc welded to the bottom of holding tanks.

Abrasive grit sequence can be the same as with a wide-belt unit. This machine can also be used to salvage cut-off sheets by changing the scratch pattern as desired.

Grind After Welding—Automatic seam welders are used to weld sheets together before rolling. A swing-frame belt grinder can be mounted on a dolly to grind after automatic welding.

This is done by mounting the dolly on a set of portable tracks, clamped to the sheets parallel with the weld. A 1-in. wide contact wheel is used on the belt grinder, and the abrasive belts are 1¼ in. wide.

Overlap of the belt on the wheel prevents the contact wheel from cutting into the sheet. Grit sequence should be 60-grit roughing, 100-grit semi-finish in aluminum oxide, and 120- or 150-grit belts with grease for finishing.

For Fixtured Welds — Grinding time depends on the quality of welding. Where possible all welds should be fixtured.

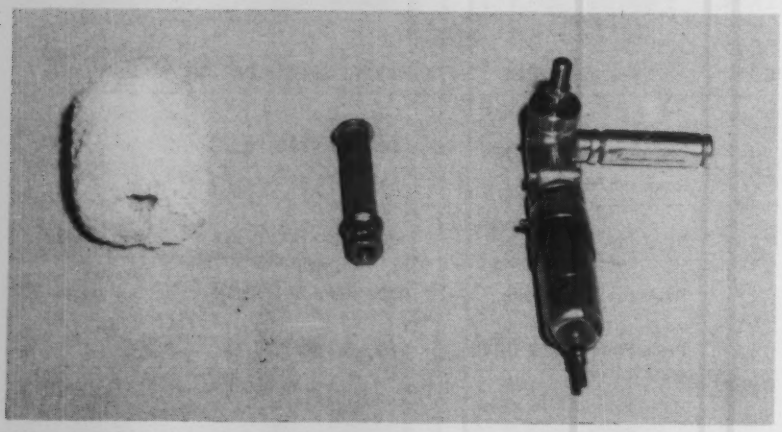
For portable grinding of flat welds, use sander disks with 60-grit, 7 in. x ⅞ resin fiber back. The disks will leave a flat surface and do away with uneven finishes.

The seam should then be ground with a 120-grit sander disk, 7 in. x ⅞. The back-up pad should be 4-in. diam. Use light pressure to

Use Right Method to Blend Welded Seams

	OPERATION	MACHINE TYPE	TYPE ABRASIVE	ABRASIVE SPECIFICATION	COMPOUND/ LUBRICANT
Flat Sheets From Automatic Heliarc Welder	SEAM GRINDING	SWING FRAME BELT GRINDER			
	Roughing		Resin Ind. Cloth Belts	60 – Alo – M – Type 6	
	Semi-Finish		Resin Ind. Cloth Belts	100 – Alo – M – Type 6	
	Appearance		Resin Ind. Cloth Belts	120 – Alo – M – Type 6	Abrasive Belt Grease
	Sanitary		Resin Ind. Cloth Belts	150 – Alo – M – Type 6	Abrasive Belt Grease
Automatic Heliarc	FIXTURED WELDS	PORTABLE TOOLS			
	Roughing	Disk Sander	Resin Fibre Sander Disks	60 – F – Alo – M	
	Semi-Finish	Disk Sander	Resin Fibre Sander Disks	Use 4-in. diam. Sander Pad Use 1 Disk on Pad 120 – F – Alo – M	Abrasive Belt Grease
	Pre-Finish	Straight Grinder 5500 – 6000 rpm	6-in. Spiral Sewn Buff		120 Grit Greaseless
	Sanitary	Angle Head Grinder 1500 rpm	4 x 4-in. Cotton Wick Wheels		80 Grit Greaseless
Non-Fixtured Heliarc	HAND WELDING	PORTABLE TOOLS			
	Roughing	Straight Grinder	Alo. Res. Wheels	10800–12000 rpm 3x⅜xH HA46-M-BRP 5500–6000 rpm 6x½xH HA46-O-BRP	
	Semi-Finish	Port-A-Belt Grind. Attach. 5500–8000 rpm 10800–12000 rpm BGA-42 BGA-12 Straight Grinder	Resin Ind. Cloth Belts	BGA42 2x20 Belts 80-Alo-M-Tp. 6 BGA12 1x12 Belts 80-Alo-M-Tp. 6	
	Semi-Finish (Optional)	Rubber Slotted Expand. Whls. 12000 rpm 6000 rpm $3\frac{13}{16}$x1xH 6x1xH Straight Grinder	Resin Ind. Cloth Belts	Wheel Size $3\frac{13}{16}$x1xH 1x12 Belts 80-Alo-M-Tp. 6 Wheel Size 6x1xH 1x18 27/32 Belts 80-Alo-M-Tp. 6	
	Semi-Finish (Optional)	Attachments in Previous Finish Straight Grinder	Resin Ind. Cloth Belts	Port-A-Belts 1x12, 2x20 120-Alo-M-Tp. 6 Rubber Slott. Wheels 1x18 27/32, 1x12 in. 120-Alo-M-Tp. 6	Abrasive Belt Grease
	Pre-Finish	Straight Grinder	6 in. Spiral Sewn Buffs 6000 rpm 3 in. Spiral Sewn Buffs 12000 rpm		120 Grit Greaseless
	Sanitary	Angle Head Grinder	4x4xH Cotton Wick Wheels		80 Grit Greaseless

FINISHING SEAMS: Operator uses buffing wheel to remove sander disk marks. Next, a wick wheel is used to blend seam with sanitary finish.



USE PROPER TOOLS: Wick wheel is soft enough not to cut into tape in weld areas. It leaves a scratch pattern similar to a sanitary finish.

allow disk to feather and eliminate gouging.

Let Compound Dry—Next a 6-in. diam spiral sewn buff is used with 120-grit greaseless compound applied. It should run at about 6000 rpm with the compound dried.

This wheel will remove sander disk marks. Next, tape the area on both sides of the weld that has been ground so as to produce a striping effect. Then, set up a 4-in. diam wick wheel with 80-grit greaseless compound. Allow compound to dry.

Run the wick wheel on a drill or grinder with 1000-1500 rpm. It's applied to the finish left by the 6-in. buff and run back and forth with straight-line strokes.

Meets Sanitary Finish—It results in a scratch pattern similar to the sanitary finish. By removing the tape, the seam weld will be striped, but close to the original finish.

The wick wheel is very soft and will not cut into the tape. Due to this softness, there's no deep grit scratch.

Head welds on elliptical or round tanks are usually not fixtured and are heavier. A grinding wheel should be used to skive down the seam.

Working area determines the size of the wheels used. Both 6- and 3-in. diam wheels are popular for this use.

Use Correct Speeds — Grinders with 6000 rpm are used on the 6-in. wheels and 12,000 rpm on the 3-in. wheels. These speeds are maximum and should be maintained.

Usually the wheels are 36 or 46 grit; too coarse a wheel in roughing makes finishing more difficult. Gradings can vary for individual cases.

After skiving the weld, either a grinding attachment or rubber-slotted expanding wheel is used with 80-grit aluminum oxide belt. Next, a 120-grit aluminum oxide belt semi-finishes the weld.

After taping the weld area, use a 120-grit greaseless compound to blend the belt finish. A 4-in. diam wick wheel with 80-grit greaseless compound at 1000 to 1500 rpm finishes the job of blending the area with the sanitary finish.

Coping With Defects—After weld areas are finished and protective coating is removed from prefinished material, a visual inspection is needed to pick out defects. These are usually caused by careless handling of pre-finished material.

Scratches are easily put into the finished sheet when the protective coating is torn. Grit from grinding will accumulate in tears and cause pits. It's necessary to remove these scratches and pits.

Slight scratches and pits can be removed with 6-in. spiral sewn buffs and 120-grit greaseless compound. Then wick wheels can be used on the entire surface to give a uniform finish.

For Deep Scratches — Deep scratches can be removed with a 120-grit resin fiber back sander disk backed up by a 4-in. sander pad. This method feathers out the area that had to be ground and gives a better appearing finish.

Use 6-in. spiral sewn buffs with 120-grit greaseless compound to take out disk marks. You can blend area with a 4-in. wick wheel with 80-grit greaseless compound.

Stainless steel should never be worked in an area where black iron or regular steel are used. Never use grinding wheels or coated abrasive products on steel and then on stainless, as rust will appear later. If wire brushes are used, wire must be made of stainless steel.

This shop cuts costs by using STANICUT *Oil 137 BCS*

Machines seven metals, one plastic with this one cutting fluid

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Frank Kruppe, Shank president (left) shows Hank Krueger of Standard Oil one of the pieces Shank Mfg. produces. Hank Krueger provides Shank plant with technical service on cutting fluids. Hank has the experience for this work. He's been doing it for six years. He has an engineering degree from Illinois Institute of Technology and has completed Standard's Sales Engineering School.

NICHOLSON
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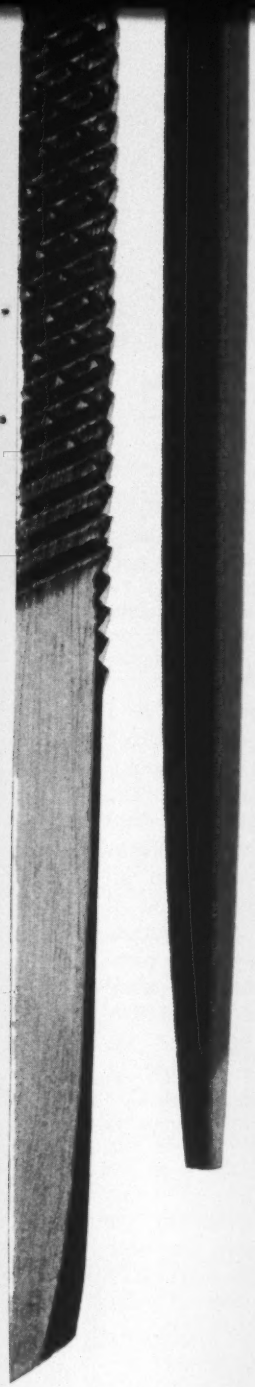

Good to the last bite . . .

Nicholson files and rasps, manufactured by the Nicholson File Company of Providence, Rhode Island, are regarded by tool experts as among the finest in the world. A long history of experience and research has taught Nicholson craftsmen how to make good, long-lasting products.

In file or rasp-making, preparation of the steel is paramount. After precision forming, the steel is carefully heat treated to develop uniform internal grain structure. A reciprocating chisel cuts the teeth, then the file or rasp is heated in a lead bath and quenched to develop hardness. It is cleaned and sharpened by sandblasting, the tang is heat treated to improve toughness, and the file is finally inspected.

U.S.Steel metallurgists have worked closely with Nicholson's designers to provide just the right special-purpose steel for each special-purpose file or rasp. Just as there is no one all-purpose file or rasp, steels, too, are made with an almost countless variety of physical and chemical properties. Every day U.S. Steel produces "special purpose" steels, with a chemistry to meet a designer's specific requirements. As the Nicholson File Company knows, "steel" is not a single product. It is an almost limitless array of practical solutions to the problems of the most imaginative and demanding designer. U.S. Steel research is available at all times to help you get a job done right. United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

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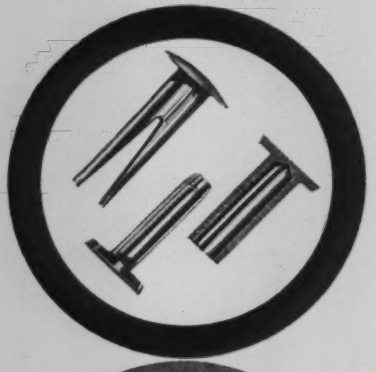
United States Steel

COST PREVENTION... NOT COST REDUCTION... IS THE EFFICIENT WAY TO LOW-COST ASSEMBLY



The 'in-place' cost of a fastener is what really counts to cost-conscious production men. By deciding on inexpensive Milford tubular rivets as a fastening method and installing them with Milford automatic rivet-setting machines, design and production engineers are eliminating costs at the initial production stage rather than trying to reduce costs later at the assembly line. Write for more information.

THE MILFORD RIVET & MACHINE CO.

MILFORD, CONNECTICUT • HATBORO, PENNA.
ELYRIA, OHIO • AURORA, ILL. • NORWALK, CALIF.

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 89.

Induction Melting

Describing the complex process which produces many of today's alloys for aircraft and missiles, a 36-page brochure also discusses present and future applications of superalloys. Property charts show the outstanding characteristics of alloys produced by the vacuum induction process as compared to the conventional high temperature alloys. (Metals Div., Kelsey-Hayes Co.)

For free copy circle No. 1 on postcard, p. 89

Sludge Trap

Design features, operation, and diagrams, of a sulfuric acid sludge trap and filter, are supplied in a two-page bulletin. The filter trap unit traps and removes concentrated sulfuric acid sludge, thereby allowing highly accurate controlled volume pumps to work at peak efficiency. (Milton Roy Co.)

For free copy circle No. 2 on postcard, p. 89

Separator Modules

Impervious-graphite separator modules are illustrated in a two-page bulletin. The modules effectively separate entrained liquids from corrosive gas streams. Discussing high collection efficiency and low pressure drop, the bulletin also includes information on design and construction of the two styles of modules available, and a table giving complete dimensions and weight. (National Carbon Co.)

For free copy circle No. 3 on postcard, p. 89

Etching Material

Described in a pamphlet is a control material for metals-working industries employing etching, photomilling, or plating techniques. The material assists in accurate and economical control of superfluous and hard-to-get-at metal from in-process pieces through etching or chemical milling; it also protects the surface of the in-process piece in areas where removal of metal is neither required nor desired. The 16-page pamphlet describes the general procedure in the use of the material. (Eastman Kodak Co.)

For free copy circle No. 4 on postcard, p. 89

Live Centers

A complete description on live centers is contained in a four-page catalog. Specifications and prices of standard shanks, with 40 other special types illustrated, are included in the catalog. Design features are: low overhang, slight cushioning action, thrust bearing absorbing all thrust load, and radial bearing taking only radial load. (Sturdimatic Tool Co.)

For free copy circle No. 5 on postcard, p. 89

Band Machines

Descriptions and illustrations of a line of high-tool-velocity band machines are contained within an 8-page catalog. Space is devoted to applications, design details, specifi-

WELDING CLINIC

J. Imperati and R. F. Pulver, Welding Engineers
The American Brass Company, Waterbury, Conn.

EVERDUR® ROD SPEEDS WELDING OF GALVANIZED STEEL

Arc welding is usually the most expedient means of reducing distortion, the major source of trouble in welding light-gage metal. However, metal-arc welding with covered electrodes adds more problems than it solves, due to difficult control and the need to remove slag and spatter from the product. Such difficulties are frequently encountered in steel sheet metal work.

In contrast, carbon-arc and inert-gas tungsten-arc welding offer easy control and eliminate slag and spatter. When these processes are used with a copper-alloy filler rod, such as Everdur-1010, control is greatly improved because Everdur's lower melting point produces bonding with only minimum melting of the steel. Increased welding speeds and the narrow heat-affected zones mean reduced distortion. Joint properties are adequate for all but the most exacting applications.

The narrow heat-affected zones make these processes attractive also for welding galvanized steel because they cause the least possible disruption of the protective zinc coating. With non-rusting copper-alloy welding rods they make the most dependable joints possible. So, Everdur-1010 has become a favorite filler metal for use with these processes in the fabrication of galvanized structural elements, ducts, and various types of container.

WELDING AIR-CONDITIONING DUCT SYSTEM FITTINGS at Carrier Corporation's plant in Philadelphia, using the carbon-arc process, with Everdur-1010 Welding Rod.

Carrier Corporation is one of the many concerns that utilize these advantages in their manufacturing operations. For many years, fittings and other components of their air-conditioning duct systems have been produced with ease and economy by welding with the carbon arc and Everdur-1010 Welding Rod.

Best results in welding either plain or galvanized steel require that only the least possible amount of steel be melted. To insure this it is necessary to avoid weaving so as to keep the arc always on the bronze weld metal. Arc lengths are kept as short as possible and current values set low enough to require welding speeds that can be handled with ease.

Joint types usually employed in sheet metal work—square butt, lapped, edge, and corner welds—are suitable for use with these processes.

Free Technical Service. If you have questions regarding the possible application of these processes to your job, Anaconda specialists will gladly help with suggestions. For such help or a copy of Publication B-13 write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

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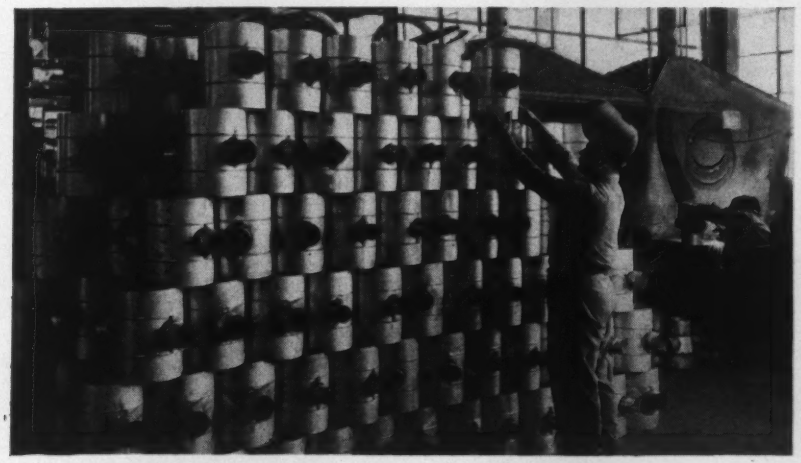


ANOTHER VIEW OF AREA devoted to welding Carrier duct system components.

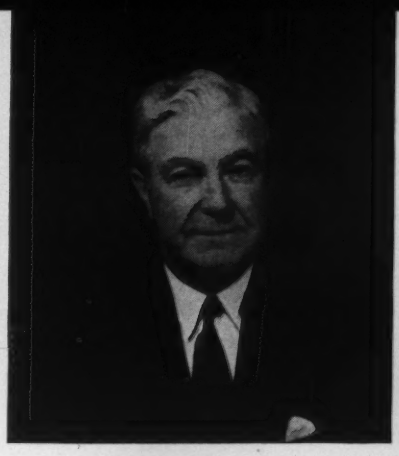
ANACONDA®
WELDING RODS
made by
The American Brass Company

Republic Reports on OPERATION 375

With a huge increase in capacity just completed, Republic is making another major move . . . spending 375 million dollars *more* for improvement and replacement of present facilities and addition of certain new facilities. Already allocated funds will be spent over the next three to four years. Here is how you will benefit.

"The new $375,000,000 capital expenditure marks our intense emphasis on customer service. In the decade ahead, customers' needs will change even more dramatically than in the past few years. *We will anticipate* those needs."

Charles M. White, *Chairman*



"We will be concentrating on changes, replacements, and additions which will raise efficiency. Raise efficiency and you improve product quality. Improve quality and you *serve customers better.*"

Thomas F. Patton, *President*

"Customers continue to increase the efficiency of their plants with more modern and more costly equipment. OPERATION 375 will enable us to provide the finishes, sizes, and other specifications required by this new equipment."

Norman W. Foy
Vice President in Charge of Sales

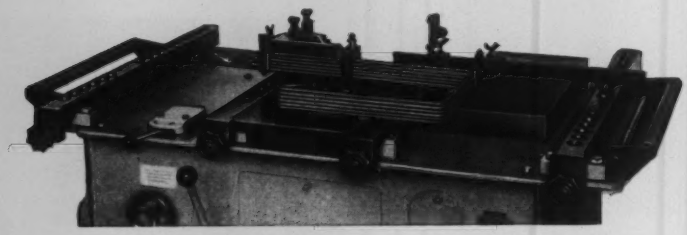
"Customers will exercise their right to be more demanding. We are building now to meet specifications which are advanced today but which, we are convinced, will become usual among our customers in 5 or 6 years."

Ernest R. Johnson
Vice President in Charge of Operations

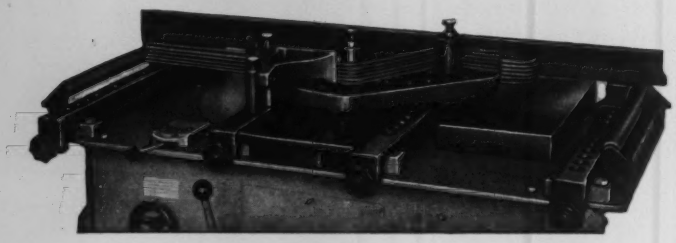
REPUBLIC STEEL

World's Widest Range
of Standard Steels and Steel Products

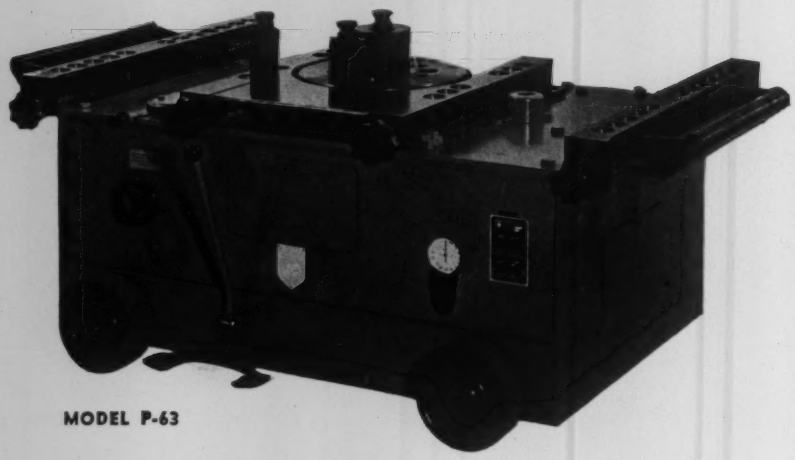
WHY BE SATISFIED WITH LESS THAN A "PERFECT" BAR BENDER?



Radius, Spiral and Stirrup attachments for greater versatility



Multiply production by double bending bars in quantity



MODEL P-63

The new "Perfect" 63—with power to "double bend" No. 14 bars in one operation. (No. 18 in Single Bends)

"Perfect" Automatic Bar Benders available in 4 sizes

#32.....1-1/4"	#50.....2"
#40.....1-9/16"	#63.....2-1/2"

And the completely new "Bifax" Stirrup and Spiral Bending Machine with bar capacity up to 1"

For more information write to:

Albert
KLINGELHOFER
MACHINE TOOL CORP.
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FREE LITERATURE

cations and attachments. The machines attain velocities as high as 15,000 fpm; this makes for speedy friction cutting. Nearly all industrial applications can use these machines. Five free services accompany each machine. (The DoALL Co.)

For free copy circle No. 6 on postcard, p. 89

Gold Plating Process

Metallurgical properties, operational data, and uses of an industrial gold electroplating formulation are contained in a six-page technical paper. Detailed coverage, of the composition of this low pH gold formulation, is included. The gold produces tarnish-free deposits to any desired practical thickness. (Sel-Rex Corp.)

For free copy circle No. 7 on postcard, p. 89

Aircraft Bolts

High-strength, light-weight aircraft bolts is the subject of a four-page bulletin. Providing 220,000-psi minimum tensile strength, the bolts weigh no more than regular bolts of 180,000 psi. The bulletin contains close-up photos, design drawings and features, specifications, and comparison tables. (Aircraft & Missiles Div., Standard Pressed Steel Co.)

For free copy circle No. 8 on postcard, p. 89

Stainless Steel Tubing

A 34-page booklet gives details on various sizes, grades, design data, corrosion resistance, and other information valuable to industries interested in welded and seamless steel tubing. Photographs, drawings, data, and more than 25 tables are included on stainless steel tubing. A section on composite tubing is also presented. (Allegheny Ludlum Steel Corp.)

For free copy circle No. 9 on postcard, p. 89

Cleaning Machine

A description of a push-button controlled, blast-cleaner unit is given in a 12-page bulletin. The table room cleans various sized pieces ranging from small parts to castings up to 10 ft wide weighing

in
forgings...

d'ARAZIEN

Alcoa puts the metal where you want it

More than a hundred tons of Douglas DC-8 kiss the runway on forged aluminum wheels like this one. Strength and lightness are obvious requirements. Even more essential is reliability through landing and after landing to guard the safety of passengers and crew.

Logically enough, rugged aluminum forgings were elected for the job. Then came many hours of Alcoa skill in die design, demonstrated in the remarkable zebra stripes visible in the cross section. They represent the aluminum grain flow* and illustrate how the tough aluminum grain is forged to withstand the shock loads of landing impact, plus the cyclic fatigue of rotation, all with a wide margin of safety.

Alcoa forges these wheels with a unique combination of blocker and finishing dies to put the metal exactly where it's needed. Alcoa Alloy 2014-T6 assures excellent machinability for the designer and producer, Bendix Products Division, Bendix Aviation Corporation. And Alcoa's forging plants, with hydraulic press capacities up to 50,000 tons, provide on-the-nose deliveries.

Think of Alcoa® Forgings when strength and lightness are rigid design requirements. Producing a complete line of forgings, Alcoa forges more large and complex shapes than any other supplier. Aluminum Company of America, 919 Alcoa Building, Pittsburgh 19, Pennsylvania.

**The patterns shown in the illustration were produced in Alcoa's Research Laboratories as part of a study of grain flow developed by the dies used to forge the DC-8 wheel.*

Alcoa puts the metal where you want it—in castings, forgings, impacts, extrusions and screw machine parts.

ALCOA ALUMINUM

ALUMINUM COMPANY OF AMERICA

For exciting drama watch "Alcoa Presents" every Tuesday, ABC-TV, and the Emmy Award winning "Alcoa Theatre" alternate Mondays, NBC-TV

Your Guide to the Best in Aluminum Value

TALL ORDER!

ACIPCO 50-FT. MANDREL GIVES LONGER LIFE IN EXACTING APPLICATION

Completely fabricated and machined by ACIPCO, this 50-foot mandrel is giving longer, more durable service to an outstanding producer of power transmission poles, light standards, and other similar equipment. These products are produced by hydraulically forming steel plate around the mandrel.

Type 4330 alloy steel, heat treated to 300 minimum Brinell hardness for wear resistance and strength, was selected for this application. The mandrel—consisting of four ACIPCO centrifugally spun tubes threaded and screwed together—is 24″ in diameter with a 3″ wall and is provided with a 0°20′20″ taper from end to end. The O. D. is finish machined and belt polished to a 125 micro-inch finish to facilitate stripping the poles from the mandrel.

This is another example of ACIPCO versatility in action . . . of how ACIPCO'S wide range of sizes and analyses, and "one source—from start to finish" facilities can solve a complicated steel tubing problem, including YOURS!

ACIPCO
SPECIAL PRODUCTS
DIVISION OF AMERICAN CAST IRON PIPE CO.
BIRMINGHAM · ALABAMA

FREE LITERATURE

Money-saving products and services are described in the literature briefed here. Publications are free with no obligation. Just circle the number on the free postcard and mail.

Platinum Metals

A brochure provides data on the wide range of noble-metal thermoelements, so as to assist users in the selection of materials suited for their purposes. The platinum metals offer high melting points, resistance to corrosion, and stability in calibration. Temperature - millivolt curves and comparisons to certain non-noble combinations are included. (Engelhard Industries, Inc.)

For free copy circle No. 21 on postcard

Plastic Laminates

Properties, grades, and sizes of laminated plastic sheets, rods, tubes, and fabricated parts, are covered in an eight-page catalog. Engineering data, product descriptions, and uses for the complete line of laminates are included. (The Richardson Co.)

For free copy circle No. 22 on postcard

Magnetostriction

Information on magnetostriction phenomena in cobalt and cobalt alloys is available in a 60-page compilation. Outlined is the reciprocal and nonreciprocal mechanical and magnetic effects on ferromagnetic materials, produced by magnetization. Included are: technical literature from the year 1874 to mid-1959, informative abstracts and tables. (For free copy write on company letterhead to Cobalt Information Center, Columbus, Ohio)

For free copy circle No. 23 on postcard

Compression Systems

An 18-page catalog provides performance and engineering data on central compression systems supplying air, nitrogen, helium, or other gases for high-pressure pneumatic applications. Systems provide pressures up to 12,000 psi and 170 scfm. The catalog includes descriptions, applications, construction features, and performance charts. (Airdox Cardox Products Co.)

For free copy circle No. 24 on postcard

Painting Systems

Trichlorethylene-based degreasing, phosphatizing, and painting systems, along with an explanation of the finishing process and costs involved, are contained in a six-page, illustrated catalog. Equipment can be incorporated into present finishing operations. (G. S. Blakeslee & Co.)

For free copy circle No. 25 on postcard

Machining Steels

An eight-page bulletin gives engineering data on cold-finished steel bars and cold-drawn steel tubing, the fastest machining bar and tubular steels available. Included are, cost and cutting speed comparisons, mechanical properties, chemical compositions, case histories, and data on tubing versus bar stock. (Joseph T. Ryerson & Son, Inc.)

For free copy circle No. 26 on postcard

Control Panels

The subject of a 12-page, illustrated bulletin is the selection of the right control panel for a variety of automatic materials - handling systems. Illustrated and described are, the "walk-in" master control panel, the floor and wall-mounted types, and the explosion-proof type. Schematic drawings of various systems, illustrated applications, and a chart of standard symbols used in graphic representation of electrical circuitry, are also contained. (Fuller Co.)

For free copy circle No. 27 on postcard

Mounted Wheels

Mounted wheels, used to perform a wide range of grinding operations, are described in a booklet. Also contained is a complete chart showing all standard shapes and sizes of mounted wheels. The chart can be detached and hung on the wall

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **2/25/60**

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FREE LITERATURE

for ready reference. A table showing recommended starting grades is also included. (Cincinnati Milling Products Div., Cincinnati Milling Machine Co.)

For free copy circle No. 28 on postcard

Boring Machines

Two small boring machines are described and illustrated in a four-page folder. A single-end and double-end model are particularly suitable for boring small holes at close center distances. Various spindle setups, and items of equipment available to add to the productivity and versatility of these machines are also illustrated. (Ex-Cell-O Corp.)

For free copy circle No. 29 on postcard

Flexible Couplings

A brochure describes a coupling consisting of two flanges with steel drive pins molded in and joined together by a laminated fabric and synthetic rubber disk. Also contained in the brochure are tables on dimensions, standard keyseats, service factors, rating capacity and bore range, and a guide to the selection of the right size. (Van Gelder Mfg., Inc.)

For free copy circle No. 30 on postcard

Toggle Switches

Detailed descriptions, photographs, diagrams, dimensional drawings, and specifications tables are contained in a 32-page catalog on toggle switches and toggle switch assemblies. Used in airborne, marine, mobile, electronic, and commercial applications, a wide selection of military versions are also contained in the catalog. (Micro Switch, Div. of Minneapolis-Honeywell Regulator Co.)

For free copy circle No. 31 on postcard

Design Guide

A design guide, to low cost air supply systems for blowing off chips, dust, and other particles from machine surfaces, is available. Included in the guide is information on the relative performance of pressure systems. The guide also demonstrates how to accomplish a more effective blowing job using less power input. (U. S. Hoffman Machinery Corp.)

For free copy circle No. 32 on postcard

Fork Trucks

Dimensions and engineering specifications of a gas-powered fork truck are given in a four-page color brochure. Drawings illustrate construction and operational features of the 2500-lb capacity truck. Included are a grade and drawbar pull chart and upright dimension table. (Clark Equipment Co.)

For free copy circle No. 33 on postcard

Tube Forming

Engineering data and information on the fabrication of tight bend tubes is offered in an eight-page bulletin. The bends are formed to short radius bends of 1:1 ratio, or less. Fitting very tight envelopes, there is no sacrifice in strength, flow, or pressure drop characteristics in the lightweight tubing. (Aeroquip Corp.)

For free copy circle No. 34 on postcard

Furnace Brazing

How and where to use electric-furnace brazing is the subject of an illustrated bulletin. The 50-page bulletin covers such subjects as selection of flux, strength of furnace-brazed parts, and how to furnace-braze cast iron. (General Electric Co.)

For free copy circle No. 35 on postcard

Enameled Aluminum

The application of porcelain enamels to aluminum is contained in a 22-page book. Alloy selection, metal preparation, choice of frit, slip formulation, firing, and the advantages of porcelain-enameled aluminum compared to those of porcelain-enameled steel are also presented. (For free copy write on company letterhead to Reynolds Metals Co., Richmond, Va.)

For free copy circle No. 36 on postcard

Quality in Ascendancy

The superiority of the vast number of products that are — and can be made from Roebling Cold Rolled Flat Spring Steel is a fact known throughout all industry.

You pay for mechanical and dimensional uniformity when you buy flat spring steel . . . you get it when you buy Roebling.

For information on how our products can help yours, write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

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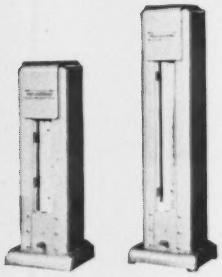
Roebling... Your Product is Better for it

5 YEAR WARRANTY



The Sheffield Corporation offers a 5 Year Quality and Reliability Warranty on Precisionaire Column Instruments now being shipped with Sheffield gaging tooling.

The Warranty is clear and positive, as reliable as the performance of the Precisionaire Column Instrument which it stands behind.

Precisionaire Column Instruments have performed so well over a 20 year period that Sheffield can make this important assurance of reliability – *at no extra cost.*

Sheffield Precisionaire Column Instruments are the most versatile and trouble-free air gages you can buy.

For reliable air gaging, specify Sheffield. Ask your Sheffield representative for details about this Warranty.

The
SHEFFIELD
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A subsidiary of the Bendix Aviation Corporation

Gages, Measuring Instruments, Automatic Gaging & Assembly Systems • Machine Tools • Contract Mfg.

as much as six tons. Photographs, cut-away diagrams, dimensions, and specifications of eight table rooms are included. (Pangborn Corp.)

For free copy circle No. 10 on postcard, p. 89

Storage Racks

Composed of high carbon rail steel, super-strength, dual-angle storage racks are described in a four-page bulletin. Providing a positive locking feature for fast assembly and quick adjustability, the racks give up to 100 pct greater strength with more capacity per shelf for pallet, skid, drive-in, coil, die, bar, and bulk storage. (Met-Fab Inc.)

For free copy circle No. 11 on postcard, p. 89

Transmitter

A differential pressure-to-current transmitter is described in a four-page specification folder. The transmitter measures differential pressure ranging from 0-20 to 0-400 in. of water; it also transmits a proportional 4- to 20-milliamperes dc signal. Supplied in the folder are specifications, dimensions, and features. (Minneapolis-Honeywell Regulator Co.)

For free copy circle No. 12 on postcard, p. 89

Lightweight Concrete

The wide use of lightweight aggregate concrete in modern construction is featured in a 20-page publication. Photographs and job reports present a clear picture of the wide variety of uses for this versatile building material. (The Master Builders Co., div. of American-Marietta Co.)

For free copy circle No. 13 on postcard, p. 89

Welding Accessories

Information on a complete line of arc-welding accessories and supplies is given in a 16-page supply catalog. Headshields, goggles, ground clamps, and welding cable are some of the items listed. (Hobart Bros. Co.)

For free copy circle No. 14 on postcard, p. 89

800 to 1 hp favorites for quiet operation, low maintenance and long-life service . . .

From the case of the A. O. Smith Motor Man — a complete stable of integrals that include single-phase models (1-5 hp) or polyphase (1-800 hp). Also a team of fractional-hp motors. All are sure bets to give top performance over the long, long haul.

And there's an A. O. Smith Motor Man near you — chomping at the bit to give you 24-hour action on all parts and service orders.

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Through research ..a better way

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ELECTRIC MOTORS
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Milwaukee 1, Wisconsin, U.S.A.

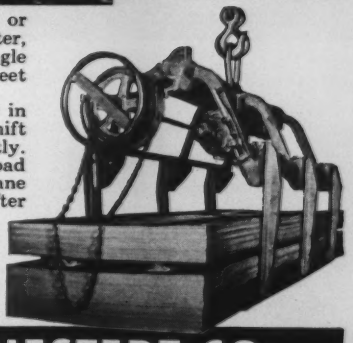
Wide *or* Narrow...

1 C-F LIFTER HANDLES THEM ALL

Whether your production requires a few or many widths of sheet steel, 1 C-F Lifter, with its wide range of jaw and carrying angle adjustments will probably meet all your sheet handling requirements.

Adjustments are made by the operator in a few seconds, permitting the Lifter to shift from wide to narrow sizes almost instantly.

Because it can pick up, carry and unload more loads per hour, using less man and crane time than any other method, a C-F Lifter will soon pay for itself.



Bulletin SL-30 gives you the complete story of C-F Lifter advantages to you. Ask for it today. There's no obligation.

CULLEN-FRIESTEDT CO.
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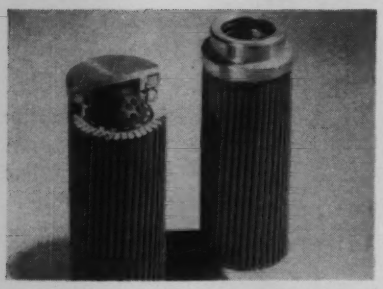
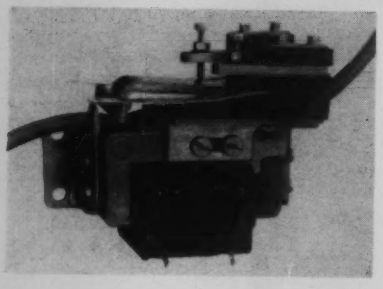
New Materials and Components



Filter Features Three-Stage Construction

A three-stage, full-flow filter consists of a non-woven material, sandwiched for support between a coarse-wire screen and a cellulose sheet. The wire screen filters out the large particles, the cellulose sheet serves as a filter and barrier providing final polish and separation of contaminants. The center filtering medium stops great quantities of very small particles. Capable of 1-micron filtration, the filter has hydraulic- and pneumatic-application possibilities. (Purolator Products, Inc.)

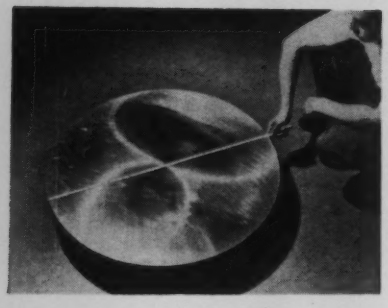
For more data circle No. 40 on postcard, p. 89



Valve Opens and Closes at Preset Times

Electro-magnetically operated, a small valve gives remote control of liquids and gases at low pressure. A clamp on a rubber tube permits ease of installation. An adjustable timer allows the valve to measure off accurate amounts, or switch flow on and off at preset times. Suitable for argon arc welding, machine-tool coolant, or lubricating control, the valve has a capacity up to ⅛-in. ID rubber tube and is suitable for pressure of approximately 10 psi; electric supply, 2-5 v ac or dc. (Milo Mfg. Co.)

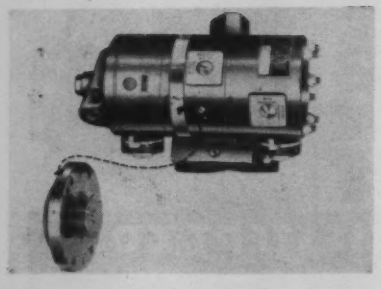
For more data circle No. 41 on postcard, p. 89



Clad-Tube Sheets Combat Corrosion Problems

Clad tube sheets are available in many combinations of materials. A patented process metallurgically bonds the cladding metal and the backing metal; this forms an integrally-clad plate that opposes dual-corrosion problems in the heat-exchanger and processing industries. Claddings can be made up to 4-in. thick varying from 1/64 to ½ in.; with the diameter now increased from 26 to 42 in. Copper-base alloys, steels, including stainless, are used to provide strong, corrosion-resistant clad plates. The clad-metal bond is over 3000 psi. (Bridgeport Brass Co.)

For more data circle No. 42 on postcard, p. 89



Device Controls Batch-Type Processes

Regulating frequent start-up, batch-type processes, a metal bellows-type controller proves-out in installations where ambient temperature is variable. Some of the advantages of the unit are: lower minimum gain, reduced drift and hysteresis, and increased sensitivity. Providing integral or remote set-points, various models serve for the following control modes: on-off, adjustable proportional, proportional plus reset, fixed proportional plus reset, and derivative control. (The Bristol Co.)

For more data circle No. 43 on postcard, p. 89

Why worry about fabricating laminated plastics? That's our job.

There is not much point to fabricating laminated plastics in your own shop. And there are good reasons why. One is the material itself.

Synthane laminates are available in sheets, rods, and tubes, and in over 33 standard grades. Choice of form and grade for your part is important. For example, a part which is basically tubular may have to be cut from a sheet rather than a tube. Or the material itself may have to be modified in order to meet your requirements.

When you do your own machining, responsibility rests finally with you. The possibility of errors in dimensions, machining and tolerances, and of waste and delay suggest that you buy your laminated plastics from us and let us do the fabricating for you. Call any of our representatives—in principal cities—for a quotation or get in touch directly with Synthane Corp., 56 River Road, Oaks, Pa.

You furnish the print . . . we'll furnish the part

SYNTHANE CORPORATION OAKS, PENNA.

Sheets • Rods • Tubes • Fabricated Parts
Molded-laminated • Molded-macerated

DESIGN DIGEST

High-Resistivity Wire

Ultra-fine, high-resistivity wire maintains a coating of a high-temperature polyester enamel. This coating broadens the use of the wire in electronic-design engineering. The new wire is a nickel-based, non-magnetic, 800 ohm, ± 10 ppm temperature-coefficient of resistance alloy. It has good stability over a wide temperature range of —65° to +150°C. Made in diameters from 0.0004 to 0.010 in., it can be readily soldered, brazed, or welded. (Molecu-Wire Corp.)

For more data circle No. 44 on postcard, p. 89

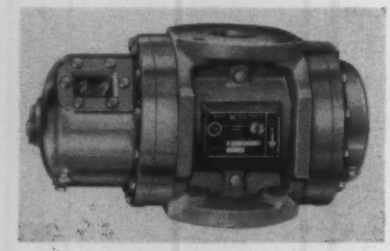
Finishing System

Eliminating corrosion in magnesium alloys, a porcelain-enamel finishing system offers the usual advantages of porcelain enameling. They are: attractive coloration and texture, and good resistance to abrasion, scratching, and chemical attack. The finishing system cannot be used with magnesium alloys of high aluminum content and of high total alloy content. High-temperature engine parts and building panels are some of the possible uses for the enameled magnesium. (Dow Chemical Co.)

For more data circle No. 45 on postcard, p. 89

Gas Meter

Providing accurate metering at lower cost, a small rotary gas meter can be flange mounted in either a horizontal or vertical gas line. Needing no additional support, it



provides straight-through gas flow. Measuring many industrial and commercial loads, the meter has a flow range to 3000 cu ft per hour, with a working pressure of 125 psi. Weighing about 55 lb, the meter has a volume register, or counter, reading in cu ft of displaced gas. (Roots-Connersville Blower, Div. of Dresser Industries, Inc.)

For more data circle No. 46 on postcard, p. 89

Ribbon Indicator

A high-amplification, null-balance, electronic ribbon indicator measures only 2 x 5-3/16 in. It can be mounted vertically or in a left or right horizontal position. The device operates on the common 0 to 0.5-v ac signal with accuracy of + or —1 pct of full signal output. It can be supplied with one—high or low—or two alarm contacts. (Swartwout Div., Crane Co.)

For more data circle No. 47 on postcard, p. 89

Aluminum Ferrules

Weighing just a few ounces, aluminum ferrules play an important role in the lifting of objects weighing many tons. The ferrules

EXECUTIVE REPORT #7

STRAIGHT-LINE DESCALING AUTOMATES WIRE AND BAR DRAWING LINES

Wheelabrator abrasive blast descaling brings new automation to wire products manufacture, with substantial savings in time and labor. Whereas batch pickling requires multiple handling operations, this mechanical descaling process involves handling coils only once or twice.

Rod can be straightened, cleaned, coated, drawn and cold headed in one continuous, straight-line operation. Single or multiple strands can be cleaned at speeds up to 600 fpm. The savings through eliminating acid pickling and multiple handling are enormous.

Take advantage of WHEELABRATOR'S engineering experience in wire descaling

Wheelabrator's unequalled experience in blast descaling of wire is at your service. Send for Bulletin 148-D illustrating the Wheelabrator automated wire drawing method. Wheelabrator Corp., 510 S. Byrkit St., Mishawaka, Ind. Canadian Division: P. O. Box 490, Scarborough, Ont.

are used to clamp together loops of heavy-wire rope for lifting machinery, crates, raw materials and even freight cars. The aluminum ferrules are rust free, corrosion resistant and watertight. They're economical to apply because they can be formed cold. (Reynolds Metals Co.)

For more data circle No. 48 on postcard, p. 89

Proximity Switch

For use on any press or similar equipment in which a "dog", "pin" or air clutch is either electrically operated or can be modified to electrical operation, a new proximity die-saver switch instantly detects malfunction. It stops heavy industrial presses or other equipment automatically. (Robotron Corp.)

For more data circle No. 49 on postcard, p. 89

Molybdenum Sheet

With improved soldering and durability characteristics, clad-molybdenum sheets can be bent or punched with no breaking away or peeling. Nickel-clad or copper-clad molybdenum sheet metal is available in thicknesses from 0.010 to 0.080 in. and in widths up to 4 in. The sheets can be used in semiconductor products, and in electronic tube applications. (General Electric Co.)

For more data circle No. 50 on postcard, p. 89

Motor Controllers

For industrial power applications, a line of motor controllers operates off 115 v, 60 cycle per second, 1-

phase supply. The unit provides adjustable dc voltages for driving shunt motors. Regulation is about ±4 pct of base speed, speed range to 50:1, and response is instantaneous. The units contain silicon rectifiers which provide a 300-pct increase in surge safety factor. The drives come in three sizes: 1/100 to ⅛-hp motors, ¼-, 1/3-, and ½-hp motors, and ¾-, 1-, and 1½-hp motors. (Magnetic Amplifiers, Inc.)

For more data circle No. 51 on postcard, p. 89

Light-Medium Casters

Uniformly designed top plates, protective-bearing dust caps and double-ball race construction of light-medium casters insure separate load and thrust raceways for maximum operating efficiency. Top plates can be fitted to bolt hole spaces ranging in size from 1¾ to 3 in. (The Colson Corp.)

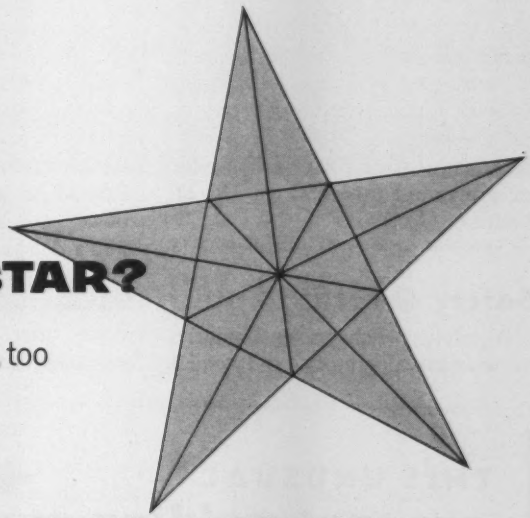
For more data circle No. 52 on postcard, p. 89

Pressure Gages

Pressure gages, with all stainless-steel components, find use in services involving corrosive atmospheres and media. The gages have

EXECUTIVE REPORT #16

HOW MANY TRIANGLES* CAN YOU FIND IN THIS STAR?



Look for the hidden value in blast cleaning abrasives, too

The "hidden values" you get in a high quality steel abrasive, like Wheelabrator Steel Shot, far outweigh any price advantage of the so-called "economy" abrasives. Wheelabrator Steel Shot is harder and tougher — lives for many more cycles through your blast equipment. It cleans better — allows shorter blast cycles. You'll get better, faster cleaning, lower maintenance, lower actual cleaning costs with top quality Wheelabrator Steel Shot. Thousands of users do. Your Wheelabrator Abrasive Engineer will prove it.

**If you examine it closely enough, you'll find 97 triangles.*

WRITE TODAY for this NEW HANDBOOK of blast cleaning abrasive performance, full of charts and facts to help you control abrasive consumption and reduce cleaning costs. Write to Wheelabrator Corp., 510 S. Byrkit St., Mishawaka, Ind. In Canada, Wheelabrator Corp., Canadian Div., P. O. Box 490, Scarborough, Ontario.

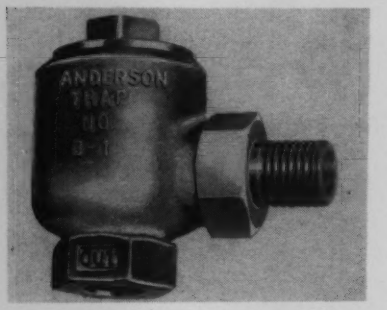
WHEELABRATOR
STEEL ABRASIVES

an accuracy of 2 pct at the working half of the scale, and 3 pct for the remainder. The gages are available in standard ranges up to 5000 psi and in dial sizes of 2, 2½, and 3 in. (United States Gauge, Div. of American Machine and Metals, Inc.)

For more data circle No. 53 on postcard, p. 89

Steam Trap

A steam trap, with a built-in union, reduces installation time and costs. The traps have outstanding condensate and air-removal characteristics. Downward-flow design prevents condensate from cooling and freezing in the trap. The steam



traps are ideal wherever temperatures drop below freezing, indoors or outdoors, as well as ordinary drainage applications. Capable of discharging up to 31,000 lb of condensate per hour, they are suitable for pressures up to 250 psi. (V. D. Anderson Co.)

For more data circle No. 54 on postcard, p. 89

Safety Switch

A safety switch prevents injuries to machine operators, and avoids damage to costly machines. The device can be attached to any machine tool which uses a key-operated chuck. The switch locks off the flow of electric current while the key chuck is in use. The safety switch operates simply: the chuck key is attached, permanently, to a cable which is spring-wound on a drum. When the key is pulled out for use, a switch is tripped, shutting off the current. (H. B. Research & Development Co.)

For more data circle No. 55 on postcard, p. 89

Thermopile Response

A reduction in response time from 0.03 to 0.01 seconds, provides a larger signal from fast, accurate vacuum thermopiles. Designed to give high speed of response, together with a high sensitivity, the devices are particularly suited for ac amplification with a chopped-beam system. Narrow metal tubes, fixed to large metal base, hold the thermopiles. (Engis Equipment Co.)

For more data circle No. 56 on postcard, p. 89

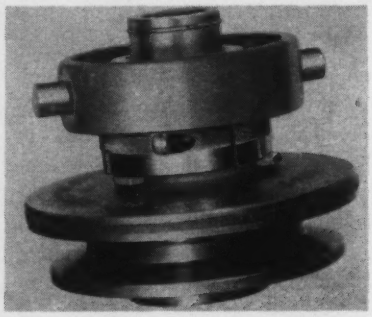
Pre-Printed Film

All types of title blocks, standard parts, wiring diagrams, and other printed matter used repeatedly on drawings, can now be quantity printed on an adhesive film, and applied when needed. Printed to order, time and manpower are saved. The transparent film's delayed setting action makes accurate positioning easy. It allows material to be re-located several hours after original application, if necessary. Made of 0.0015-in. thick acetate, the matte outer surface allows use of pen, pencil, or typewriter. It can take repeated erasures with no reduction in clearness. (Keuffel & Esser Co.)

For more data circle No. 57 on postcard, p. 89

Disc Clutch

New-type disc clutches feature integral single or double V-belt sheaves, mounted on double-seal

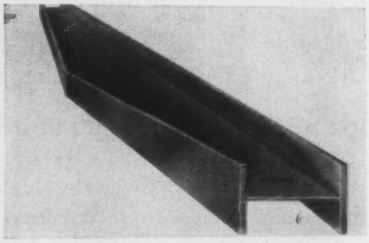


ball bearings. The clutches are for heavy-duty service on keyed stub or through shafts from ⅝- to 1¼-in. diam, at speeds up to 4000 rpm. A cam action holds the clutch in the engaged position; take-up adjustment and replacement of asbestos friction disc are easy to make in the field. (Edgemont Machine Co.)

For more data circle No. 58 on postcard, p. 89

Steel-Tapered Girders

Consisting of three plates—top and bottom flanges and web—new girders may be varied in size to



suit structural needs. By varying the taper, inverting the beam, cantilevering or other combinations of tapered girders, many types of roof and floor plans are made practical. (Shlagro Steel Products Corp.)

For more data circle No. 59 on postcard, p. 89

Alarm Control

Combining float action and electrode-operated functions in a com-

THIS UNUSUAL
arc spot welding gun
WELDS FROM ONE SIDE WITHOUT A BACK UP ELECTRODE!
This gun can replace very expensive spot welding equipment. It is the only gun of its kind with automatic time control. Light weight . . . weighs only two pounds. Pistol grip is easy to handle . . . no levers or triggers to actuate while welding. Applications include duct work, tanks, cabinets, roofing, plumbing, signs, auto body work, general maintenance and sheet metal. Gun can be used for operation on 115 volts. Other voltages available. Demonstration may be arranged in your plant. Request Bulletin G for complete data.

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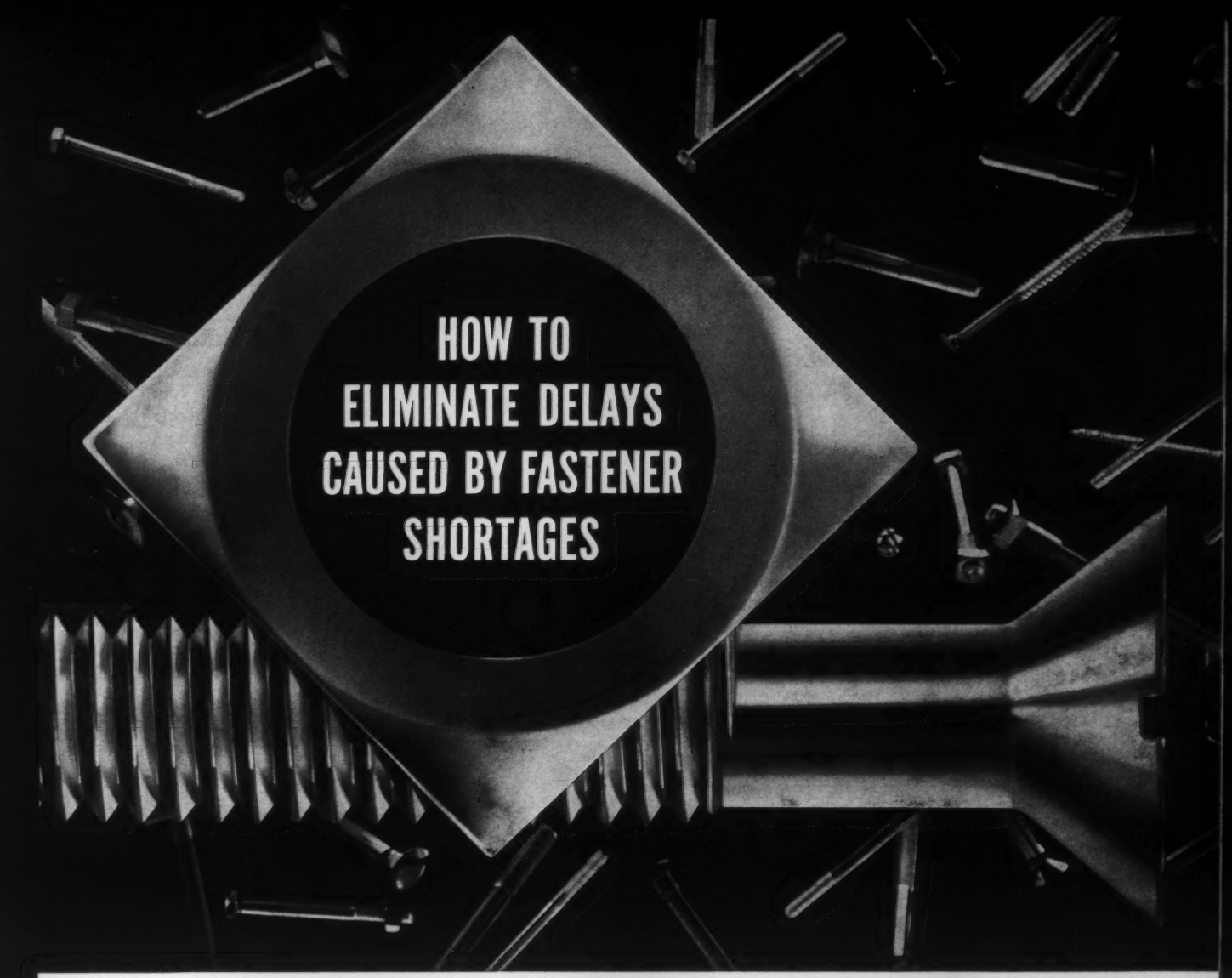


Your Republic Bolt and Nut Distributor Can Help You

From his complete inventories, he can give you quick delivery of fasteners of any type and size —in any quantity, from a single bolt . . . to broken or full case lots.

By so doing, your local Republic Bolt and Nut Distributor eliminates the trouble and expense of maintaining your own on-hand stocks. The net result is a reduction in over-all costs —to you, to your customers, and to the eventual consumer. Your local distributor therefore performs a vital function in today's industrial system.

He is also in a position to provide you with complete information on current fastener trends and techniques. It will pay you to familiarize yourself with the wide range of services he offers you. Contact your local Republic Bolt and Nut Distributor now.

Call your local distributor for quick deliveries of . . .

REPUBLIC Bolts and Nuts

REPUBLIC STEEL

Somers

STAINLESS STEEL

THIN STRIP

.010 to .001 25" wide; down to .00015 in narrower widths.

All regular commercial tempers.

Commercial bright anneal finish.

Unique annealing facilities provide uniform temper and uncontaminated surface.

Coils or cut lengths, both with #3 edge.

302, 305, 321, 347, 430, 17-7PH, PH15-7MO plus various high temperature alloys and rare metals.

Available for prompt shipment in production quantities.

FOR EXACTING STANDARDS ONLY

Somers THIN STRIP

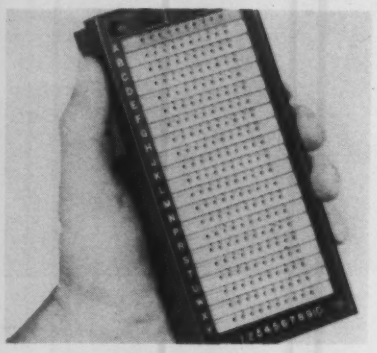
Somers Brass Company, Inc.
102 BALDWIN AVE., WATERBURY, CONN.

mon water chamber, a boiler safety device provides fuel cut-out and low alarm. It can also be used for dual fuel cut-out, or dual fuel cut-out and low alarm. The float action operates a sensitive switch, thrown open or closed through the medium of a permanent magnet and special armature. One or two electrodes release fuel cut-out or actuate alarms. The device is useful on boiler working-steam pressures to 350 lb. or 650 psi in tank service. (The Reliance Gauge Column Co.)

For more data circle No. 60 on postcard, p. 89

Static Control

Color-coded, static-control components provide switching rates up to 25,000 per second. Based on a transistor unit which accomplishes all logic functions, the static system is easy to apply to conventional circuits. The components can be



applied as desired without regard to phase sensitivity. Tapered pin connections provide positive external circuitry. Logic elements come in space-saving modules and are capsulated for resistance to shock and environmental conditions. (Square D Co.)

For more data circle No. 61 on postcard, p. 89

Adhesive Film

A double-faced adhesive film holds nonferrous metals on magnetic chucks, for surface-grinding operations. The film is a translucent pressure-sensitive adhesive supported by a protective release paper. Use of the film permits the operator to place each piece where he wants it; the grinding surface is not limited. A portable applicator enables the operator to apply the film without touching it, thereby eliminating the possibility of reducing the bond strength. Rolls are available up to 72 yd long. (Interchemical Corp.)

For more data circle No. 62 on postcard, p. 89

Thermocouple Glands

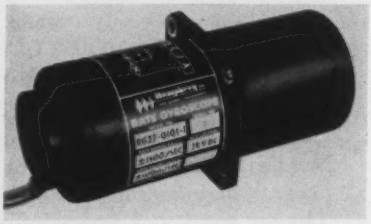
Stainless-steel, thermocouple glands pressure seal two or four, 20- or 24-gage bare-wire thermocouples. The midget-sized glands are only 1¼ in. long by 9/16 in. hex. The units provide a positive

pressure seal from 0.005 microns to 5000 psi. The temperature range of the glands is from -300° to +1850°F. The glands can be used and reused by simply replacing ceramic insulators and sealant. (Conax Corp.)

For more data circle No. 63 on postcard, p. 89

Miniature Gyro

A miniaturized, dual-axis rate gyro, only 4 in. long and 1¾ in. in diameter, reduces costs by doing the work of two different axes — such as pitch and yaw in a missile. The unit has two independent



potentiometer pickoffs, one for each axis. All metal construction permits high-level excitation and powerful output signal. Each pot will dissipate up to 2 w. Excitation voltage up to 60 v may be used. (Humphrey, Inc.)

For more data circle No. 64 on postcard, p. 89

PERFORMANCE

Put a ball bearing to work and you can soon tell whether it has it or not. And "it" is a combination of many things: balance, speed, quiet, smooth running.

Federal ball bearings have all these qualities. And tough SAE 52100 steel gives them the trouper's "heart" that keeps them at their best—performance after performance.

Any wonder why Federal ball bearings have been winning the applause of so many of the most demanding companies in American industry? They'll star for you, too. Send for the Federal catalog which includes practically every type and size bearing you may need. It's one of the greatest ball bearing shows on earth... and one that's been going on for almost fifty years!

THE FEDERAL BEARINGS CO., INC., Poughkeepsie, N. Y.

FEDERAL ON FILM—A 16 mm. color sound film takes you through our 400,000 sq. ft. plant. Loaned free. Just ask for it.

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BALL BEARINGS

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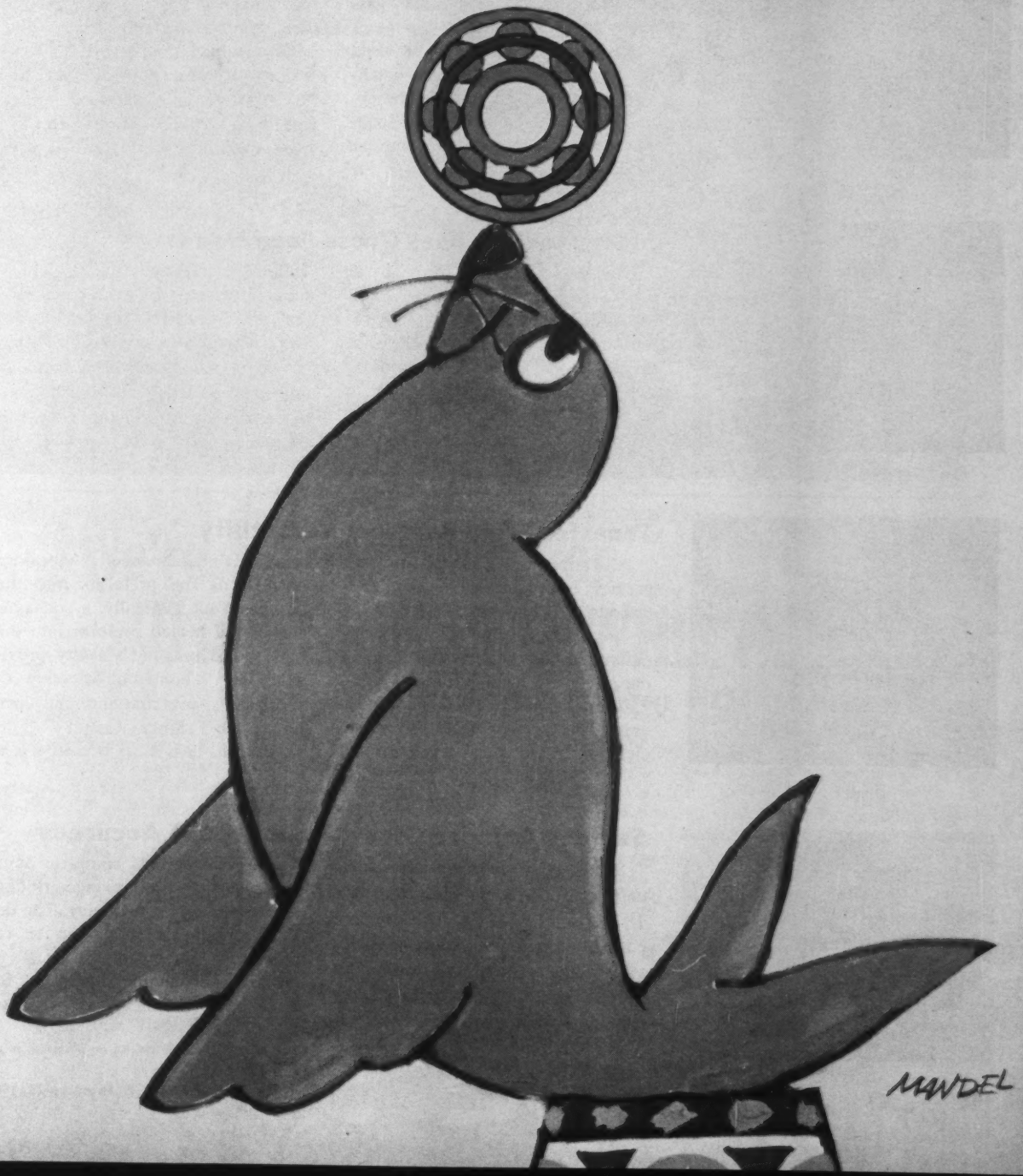
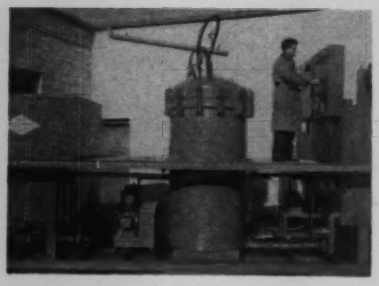


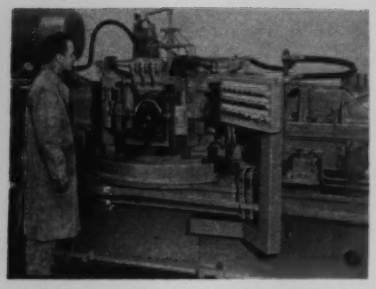
New Equipment and Machinery



Machine Has Central-Station Control Mounting

Sealing microscopic porosity in high-pressure blowers and gas-meter casings, a batch-type impregnation machine can also be used for any casting suited to batch-type processing. A central-station, double-section control panel contains all valves, control buttons, and instrumentation. The unit is recommended for use with metal-oxide-type sealant materials. The basic machine consists of a 365-gal autoclave, 500-gal sealant-holding tank, and a 500-gal purge-rinse tank. (Prenco Mfg. Corp.)

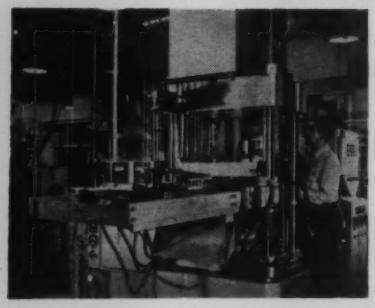
For more data circle No. 65 on postcard, p. 89



Index Machine Uses Cross-Feed Heads

Utilizing cross-feed heads in all work stations, a three-way dial-index machine mills, drills, chamfers, and reams castings. The unit processes malleable iron, automotive differential carriers at a rate of 85 pieces per hour at 100 pct efficiency. A fixture provides air-actuated wedge-type jacks, which support the part for heavy machining operations. The machine operates hydraulically, and push-buttons provide electric control. Load and unload is carried out during the machining cycle. (Snyder Corp.)

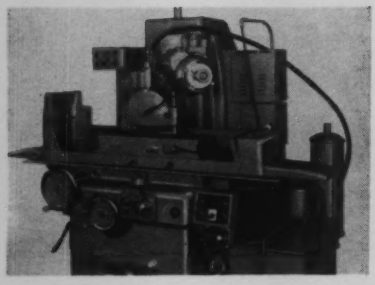
For more data circle No. 66 on postcard, p. 89



Transfer Press Features Versatility

A series of transfer molding presses each operate either continuously (fully - automatic basis), or periodically (manual or semi-automatic basis). Three machines in one, they are available in 50-, 75-, 150-ton capacities, and a 300-ton unit. The presses feature positive ejection, rapid press cycling, and minimum maintenance. A vibratory bowl feeds the preforms into the preheater automatically; a conveyor carries the heated preform into the mold. The machine's safety provisions are: automatic detection of short shots, overcharging, and open molds. (F. J. Stokes Corp.)

For more data circle No. 67 on postcard, p. 89



Surface Grinder Gives Good Repeat Accuracy

Saddle-type, surface-grinding machines provide table sizes from 6 x 18 in. to 24 x 48 in. The grinders contain an automatic down-feed device which allows the operator to preset amount of stock to be removed; it automatically shuts off after stock removal. The new down-feed device permits complete automatic surface- and plunge-grinding to extreme repeat accuracy. The desired amount of stock can be removed in increments of 0.01 to 0.0001 in., leaving 0.0001 in. for finish pass. (Gallmeyer & Livingston Co.)

For more data circle No. 68 on postcard, p. 89

GRINDING WHEELS

"U.S." Grinding Wheels installed on Naxos-Union roll grinder.

"We're standardizing on 'U.S.' GRINDING WHEELS"

—Mr. Alex Munroe, Revere Copper & Brass, Inc.

After Alex Munroe of Revere's Baltimore plant installed "U.S." Grinding Wheels on their Naxos-Union roll grinders (for reconditioning rolls on their Sendzimir 51" rolling mill) several things were immediately apparent. Chatter was eliminated and stock removal was clean and efficient. Grinding time was cut approximately 30% while producing a regular finish.

That's why Revere is standardizing on "U.S." Grinding Wheels, not only on roll grinders but for reconditioning large back-up rolls. In fact, wherever "U.S." Wheels are used, performance reports have been excellent.

If you, as a manufacturer, want to reduce grinding wheel costs and increase production, "U.S." has what it takes. For "U.S." Wheels consistently outperform and reduce costs in case after case. Get in touch with your "U.S." Representative today or write or call the address below.

Mechanical Goods Division

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WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

NEW EQUIPMENT

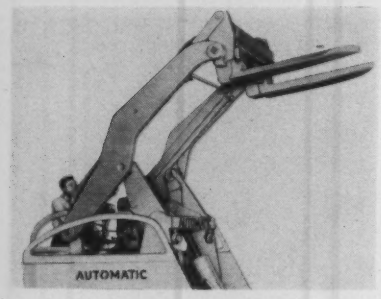
Reamer Lapper

Maintaining a super finish, a cluster lapper laps reamers to precision sizes, without removing reamer from the machine setup. Cutting oversize, the device provides for lapping reamers to off sizes with close tolerances, to achieve perfect dimensions. There are 16 adjustable sizes in one lap. The range is from 1/32 to 1 in. in 6 different models. Offering lower-cost machine operations and greater perfection in the end product, the unit is also ideal for lapping standard drills to off sizes. (M K M Machine Co.)

For more data circle No. 69 on postcard, p. 89

Industrial Truck

Obtaining maximum fuel efficiency and economy, a mastless industrial truck is capable of moving heavy steel coils in and out of boxcars; it is able to stack 120-in. high. The stand-up, elbow lift's design affords the performance of all functions required of an industrial truck in steel-mill, or heavy-duty operations. Swept-back designed plexi-glass guards give maximum



driver safety. The power unit consists of a 4-cylinder engine that slides out for easy inspection. It can operate on straight gas or LPG fuel. (Automatic Transportation Co.)

For more data circle No. 70 on postcard, p. 89

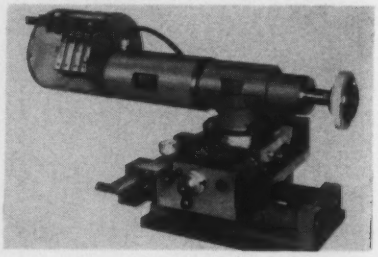
Silver-Brazing Course

Principles and techniques of silver-alloy brazing comprise a packaged, self-study training course. The course comes complete, containing three comprehensive textbooks and all parts, materials, and supplies needed to perform lesson exercises. Where in-plant gas is not available, a torch tip for hand-held gas cylinders is included at slight additional cost. (Handy & Harman)

For more data circle No. 71 on postcard, p. 89

Electrolytic Spindles

Equipped to operate at 1000 amp, a spindle for electrolytic grinding employs a 2-hp, 3600-



rpm motor. The spindle is mounted on a heavy-duty universal slide. Attached to the slide are large dial indicators for measuring feed of the work in ten-thousands of an inch.

IN THE VACUUM MELTING FIELD . . .

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colossus in stainless

...world's largest stainless steel plates ready for processing at Carlson

SOMETIMES Carlson service is a cooperative venture that gets practically impossible jobs done. The processing and finishing of these, the world's largest stainless steel plates, is an example of such teamwork.

As this was a "first time" job, the most careful planning and coordination had to be exercised. Oversize ingot molds and a 70-ton capacity furnace had to be used. It took the country's largest plate mill to roll the ingots to slabs, the slabs to plates. The finished plates, cut-to-shape by Carlson specialists, met every customer requirement.

These huge plates, of Type 304 stainless steel, were made to Specification A-240 Grade S (ASTM A240-T). Each plate weighed over 49,000 pounds; one measured 461" x 179" x 2"; the other 451" x 184" x 2". Destined for a nuclear application, these plates were flame-cut and abrasive-cut to make two half-circles. The entire order totaled nearly 100,000 pounds.

Cooperation made this "colossus" a success—cooperation under the knowing eyes of Carlson specialists. This same team is ready to work on your order. We invite you to write, wire or phone for further information.

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PLATES • PLATE PRODUCTS • HEADS • RINGS • CIRCLES • FLANGES • FORGINGS • BARS and SHEETS (No. 1 Finish)

Total eccentricity of the precision spindle shafts is less than 0.00005 in. (Pope Machinery Corp.)

For more data circle No. 72 on postcard, p. 89

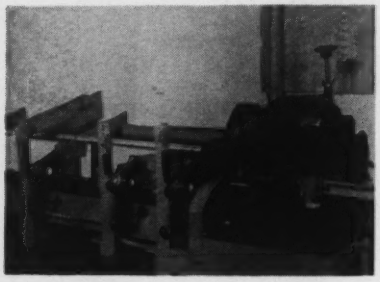
Drying Assist

For pickled or plated parts, a drying assist prevents corrosion and stops rusting associated with poor drying procedures. It eliminates spotting on chrome plate, staining on silver and copper-plated work. It is especially suited to applications where high rinse-water temperatures are unavailable, or where automatic equipment lacks drying facilities. (Conversion Chemical Corp.)

For more data circle No. 73 on postcard, p. 89

Cut-Off Machine

Fully - automatic, tube - feeding and cut-off operations are performed by a machine insensitive against bent tubes. Entirely of open construction, the unit consists of a welded steel bed and frame with renewable steel ways. This rugged machine permits easy removal of misformed material. A motor-



driven 7-in. diam steel wheel performs cutting operations. The cutting speed is up to 1200 pieces per hour. (Automation Design & Machinery Co., Inc.)

For more data circle No. 74 on postcard, p. 89

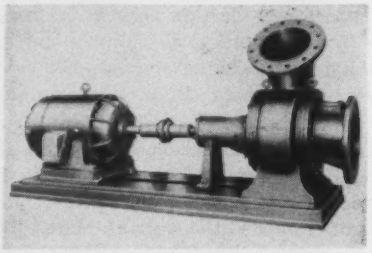
Translucent Tank

Any liquid level can be clearly seen through a translucent tank, and the volume unmistakably read on a calibrated gage. The gage runs the height of the tank. Reading inventory and controlling batching amounts, overfillings due to faulty readings are eliminated. The tanks with gages are suitable for any liquids, including corrosives or distilled water. They are available in standard sizes. (Jones & Hunt, Inc.)

For more data circle No. 75 on postcard, p. 89

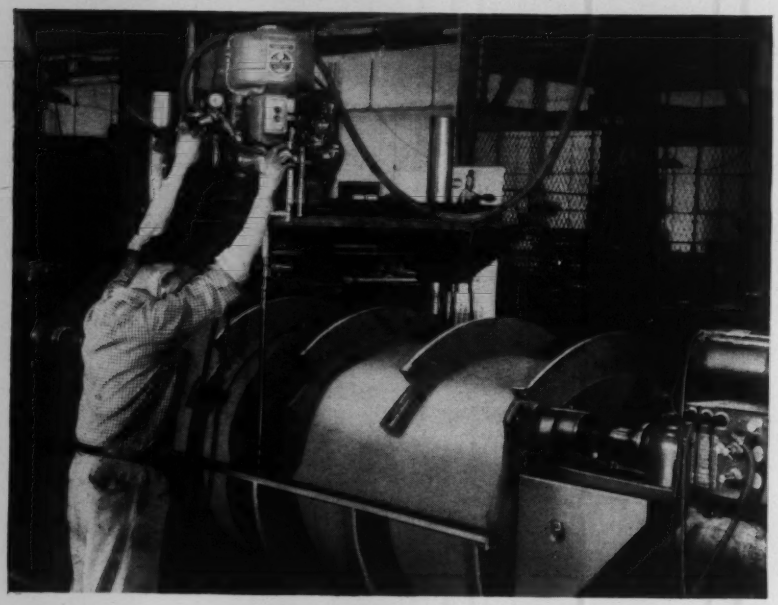
Solids Handling Pumps

Meeting severe operating conditions found in the process and allied industries, a line of heavy-duty process pumps has a capacity range up to 9500 gpm for heads up to 220 ft. They are especially adapted



for handling, 1. fluids with fibrous solids in suspension, 2. thick liquids of all types, and 3. under conditions where temperatures up to 350°F and working pressure up to 400 lb are encountered. The pumps

WALKER-TURNER 20″ Drill Press



Cuts drilling time 1/3

By mounting a standard Walker-Turner drill press on a carriage that rides alongside this large work piece, the Harris Seybold Company, Cleveland, Ohio, saves extra handling time and combines a drilling and tapping operation. Not only does this low cost, special set-up eliminate time formerly used to carry the work piece to a radial drilling machine, it frees the machine for other production jobs.

These fast, accurate, versatile drill presses, like all W-T "Light Heavyweight" metalworking tools, pay their own way in standard applications or special set-ups. And because they are built to withstand years of rugged use, they give you extra value for your money. See the complete line of 20″, 17″, 15″ and new 14″ Hi Speed drill presses your Walker-Turner Distributor carries. He's listed under "TOOLS" or "MACHINE TOOLS" in the Yellow Pages. Call him soon.

FREE CATALOG—Shows the full line of W-T metalworking tools and accessories. Write: Rockwell Manufacturing Co., Walker-Turner Division, Dept. WB-28, 400 N. Lexington Ave., Pittsburgh 8, Pa. In Canada: Rockwell Manufacturing Co., Ltd., Guelph, Ont.

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"LIGHT-HEAVYWEIGHT" MACHINE TOOLS
another fine product by
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. . . are a sum total of manual skill, metallurgical technique and technical manufacturing controls. The complete line includes many major roll types, subdivided into distinct analyses to meet a variety of job requirements. *Sales Department, Engineering Department and Mfg. Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.

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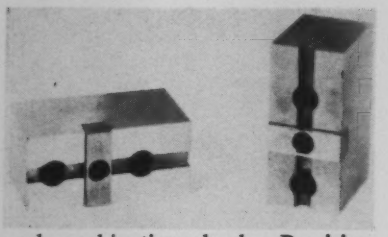
STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel.

are of the end-suction, vertically-split type. Suited for 24-hour service, all pumps have 45° self-venting discharge connections. (Goulds Pumps, Inc.)

For more data circle No. 76 on postcard, p. 89

Chuck Jaws

A complete selection of soft-blank chuck jaws is available for air chucks, hand- or power-operated geared-scroll chucks, two-jaw and four-jaw independent chucks,



and combination chucks. Precision made, they come in two different heights — standard short-jaw and long-jaw models. Sides of jaws are chamfered on back faces to fit chucks with recessed jaws. Close standard tolerances on tongues and grooves insure accuracy and interchangeability. (Gahr Machine Co.)

For more data circle No. 77 on postcard, p. 89

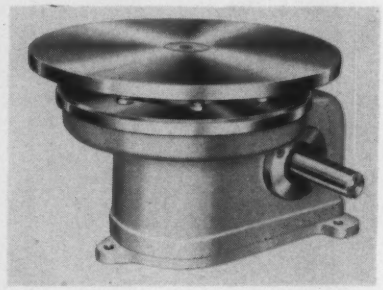
Angle Gage

Available with an adjustable zero position, a clinometer-vernier angle gage determines any angle of inclination, from the true horizontal plane. Contained in a shell-molded case with a rust-protected 12-in. base, this sturdy, portable instrument is unaffected by shocks or vibrations. Employing the gravity system, there are no gears or other mechanical linkage. Its measuring range is 0° to 360°; it is self checking. The reading is direct to one minute, but repetition has been tested to a precision of 7½ seconds. (Engis Equipment Co.)

For more data circle No. 78 on postcard, p. 89

Indexing Unit

Providing intermittent motion for high-volume assembly and processing operations, a turret indexing unit provides use for semi-automatic bench operations. It can also be used as a small automatic machine chassis, or an auxiliary turret on larger automatic machines. Fully mechanical, the unit has a 12-in.



diam turret, eight work stations, and an index to dwell relationship of 1:1 (180° index). The package unit incorporates, drive motor, reduction unit, and main camshaft extension for mounting tool-actuating cams. (Swanson-Erie Corp.)

For more data circle No. 79 on postcard, p. 89

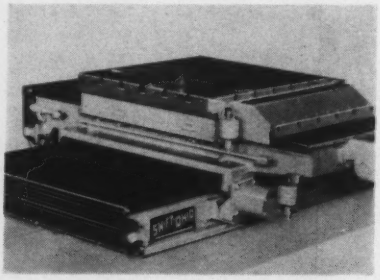
Finishing Machine

A low-cost, barrel-finishing machine provides deburring, radiusing, and finishing for small parts. The automatic tumbling machine is portable, economical, and ideal for close-tolerance work. Weighing only 64 lb, with all steel construction, the machine enables a plant to set up its own barrel-finishing facilities in limited space. (Chicago Wheel & Mfg. Co.)

For more data circle No. 80 on postcard, p. 89

Indexing Table

An indexing table allows the user to modernize without complete replacement of equipment. It pro-



vides use with radial-drilling upright drills, and horizontal boring and drilling machines. This numerically position-controlled compound table is 36 x 36 in. square.

Since 1903

GEO. F. MARCHANT CO.

PUNCHES - DIES
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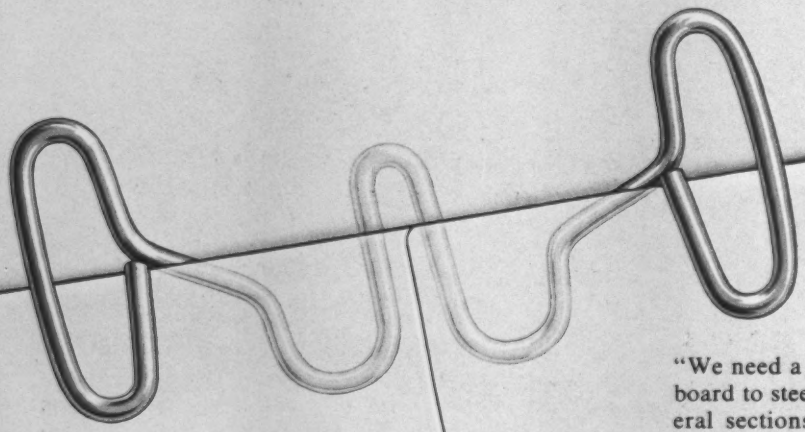
KEYSTONE WIRE... DUDEK & BOCK

turn an idea into a reality



"We need a clip that will securely fasten gypsum board to steel upright studs—or join and hold several sections of board in perfect alignment for plastering. Here's what it must look like."

This is the challenge. Designers at Dudek & Bock, Chicago, Illinois, roll up their shirt sleeves. They analyze wire requirements: tensile, uniformity. Length of run—a long one. Delivery—soon.

What wire fits these requirements? Keystone Silver Brite Galvanized high tensile wire is first choice. They know from experience they can depend on Keystone wire to perform exactly as calculated—order after order—run after run. By standardizing on Keystone wire for the majority of their needs, Dudek & Bock simplify quality control and manufacturing problems. They regularly use a wide selection of Keystone wire to meet their forming and spring requirements—this includes low and high carbon wire, brite and galvanized.

Result: Another fastener problem solved with wire . . . delivery on schedule of this gypsum board clip and thousands of other items . . . and maximum customer satisfaction.

Perhaps creative imagination and Keystone wire can help you build your products faster, better, at lower cost. A Keystone cold heading or wire forming specialist is available to help you.

Keystone Steel & Wire Company, Peoria, Illinois

KEYSTONE

WIRE FOR INDUSTRY

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Udylite offers new products, processes

MAJOR DEVELOPMENTS IN EVERY PHASE OF THE INDUSTRY COME FROM THE WORLD'S LARGEST PLATING SUPPLIER

Udylite steps up the production of new equipment and processes and continues its expanding program of research and new product development. Here are some of the New benefit-packed innovations that Udylite has ready for you NOW.

New Barrel assembly Just released, Udylok-Tempron Barrel Assembly . . . unique interlocking cylinder construction which permits speedy field repair . . . tie-rod-free construction . . . twelve machine screws the only metal used in cylinder . . . advanced ring gear design with heavy duty, four pitch gearing for greater strength . . . longer life . . . made of non-corrosive Udylon . . . *and* a revolutionary new superstructure design.

New Rectifier line A whole new line . . . completely re-designed from the ground up . . . economies affected with new method of manufacture mean real savings in your original cost . . . keep maintenance and replacement costs minimum . . . fully guaranteed and built to usual high standards of Udylite quality construction.

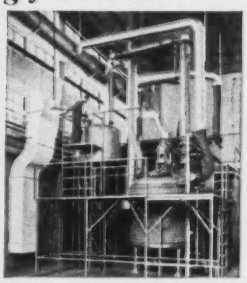
New Tank lining Brand new tank lining . . . for special applications . . . introducing a new recently perfected material of unusual properties . . . an EXCLUSIVE with Udylite.

New Filter series Improved . . . high area . . . low pressure filters . . . designed with economy of operation in mind for you . . . long range savings . . . low, low maintenance costs . . . greatly increased efficiency . . . full range of sizes and capacities.

New Processes due Another great forward step in the battle against corrosion . . . A NEW Udylite bright plate process . . . now under rigorous testing for introduction early in the spring . . . a product of the continuing research and development that gave you "The Incomparable 66" and Bi/NICKEL.

New Automatic Machine features Plating automation . . . equipment advances . . . including new skip mechanism . . . 1960 models of Cyclemaster . . . and the famous Udylite V.I.P., automated barrel plating machine . . . to fit economy budgets.

New manufacturing facilities $600,000.00 expansion program at Udylite, Detroit . . . installation permits quality controlled production of vital raw materials . . . guarantees source of supply . . . provides you with product of insured purity . . . at a reasonable price.



Giant autoclave . . . new plant facility at Udylite

The newest and the best in plating supplies, equipment and processes . . . products such as those shown here flow constantly from Udylite to industry. Watch for detailed announcements every month. If you'd like to learn more about any of the developments we've talked about right away, just get in touch with your Udylite man today or write to:

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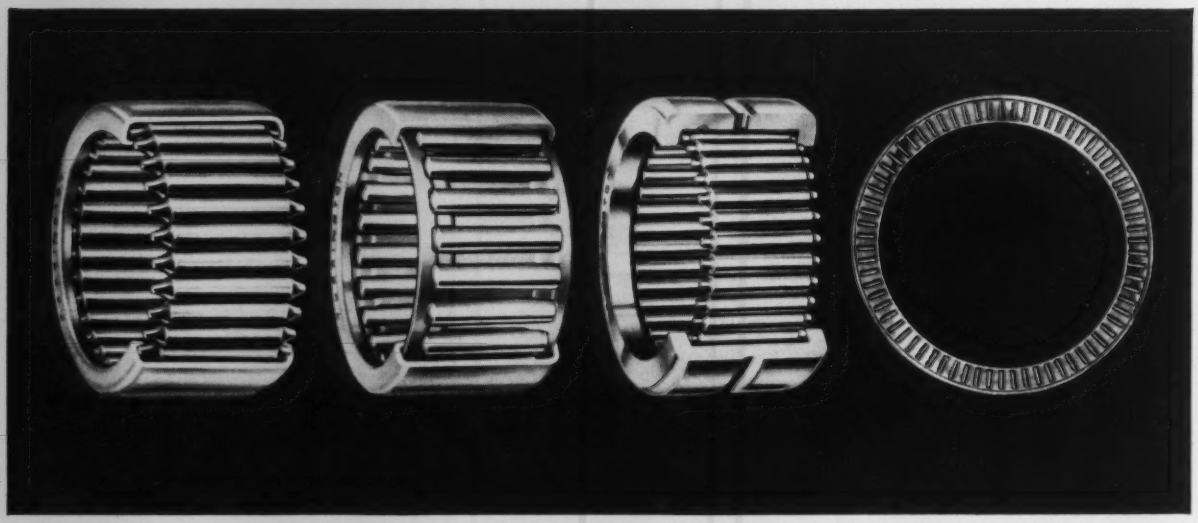
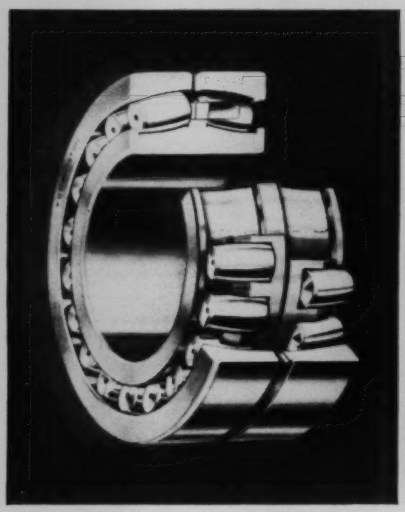
Designer and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

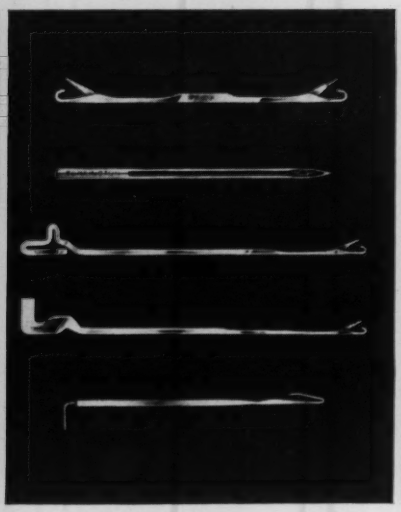
YES, TORRINGTON IS THE PIONEER MANUFACTURER OF THE REVOLUTIONARY NEEDLE BEARING...



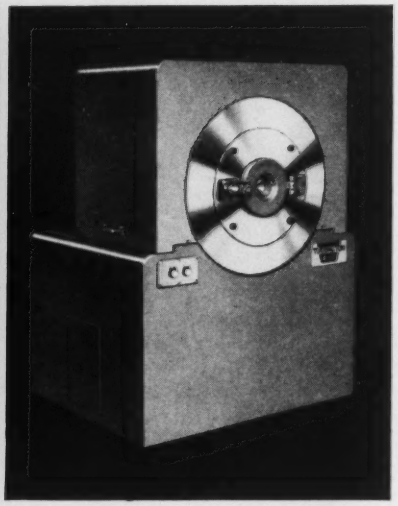
BUT THIS, TOO, IS TORRINGTON...



Leading manufacturer of spherical roller bearings for rugged applications in the paper, steel, oil and construction industries



Since 1866 America's largest producer of precision-made machine needles for every need: knitting, sewing, tufting and felting



Originator of the rotary swaging process and largest manufacturer and user of rotary swaging machines in the world

In these and many other fields throughout the world Torrington is contributing to

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THE TORRINGTON COMPANY

Torrington, Conn.

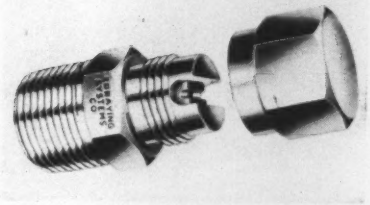
Serving industry from plants located in the United States, Canada, England, Germany and Italy.

Construction of the table allows for work loads up to 4000-lb capacity and drilling thrusts of 5000 lb. The table unit has a traverse rate of 150 ipm. Ten machined tee slots permit easier positioning of work pieces. (Swift Ohio Corp.)

For more data circle No. 81 on postcard, p. 89

Descaling Nozzles

External threads, on the outlet end of the nozzle body, provide adjustment to change the width of the spray pattern of a descaling nozzle. The stainless-steel nozzle



permits the duplication of widths of various strips that may be run in a hot strip mill. Stainless-steel caps cover any nozzle in a manifold that is to be shut off. Use of these nozzles and caps results in material water saving when rolling narrower strips. (Spraying Systems Co.)

For more data circle No. 82 on postcard, p. 89

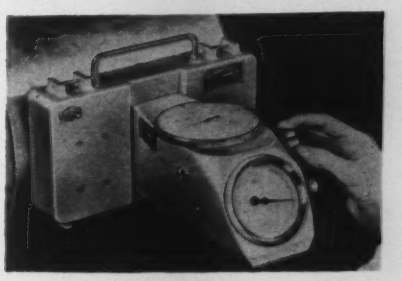
Safety Shield

Providing protection to operators of drill presses, lathes, milling machines, grinders, and related equipment, a portable, magnetic safety shield moves to any desired, critical spot. Shielding the worker's eyes, face, hands, arms, and clothing, the transparant shield measures 10¼ x 5½ in. Magnets allow the shield to be mounted horizontally, vertically, at any angle, or in a curved position. (Better Specialities, Inc.)

For more data circle No. 83 on postcard, p. 89

Portable Tester

Fitted with an electromagnetic or chain clamp, a portable hardness tester can make Rockwell tests in the factory or the field. A hydraulic pressure unit applies a minor load of 10 kg and a major load up to 150 kg for normal Rockwell-testing procedures. Readings are in Rockwell A, B, or C scales. When the

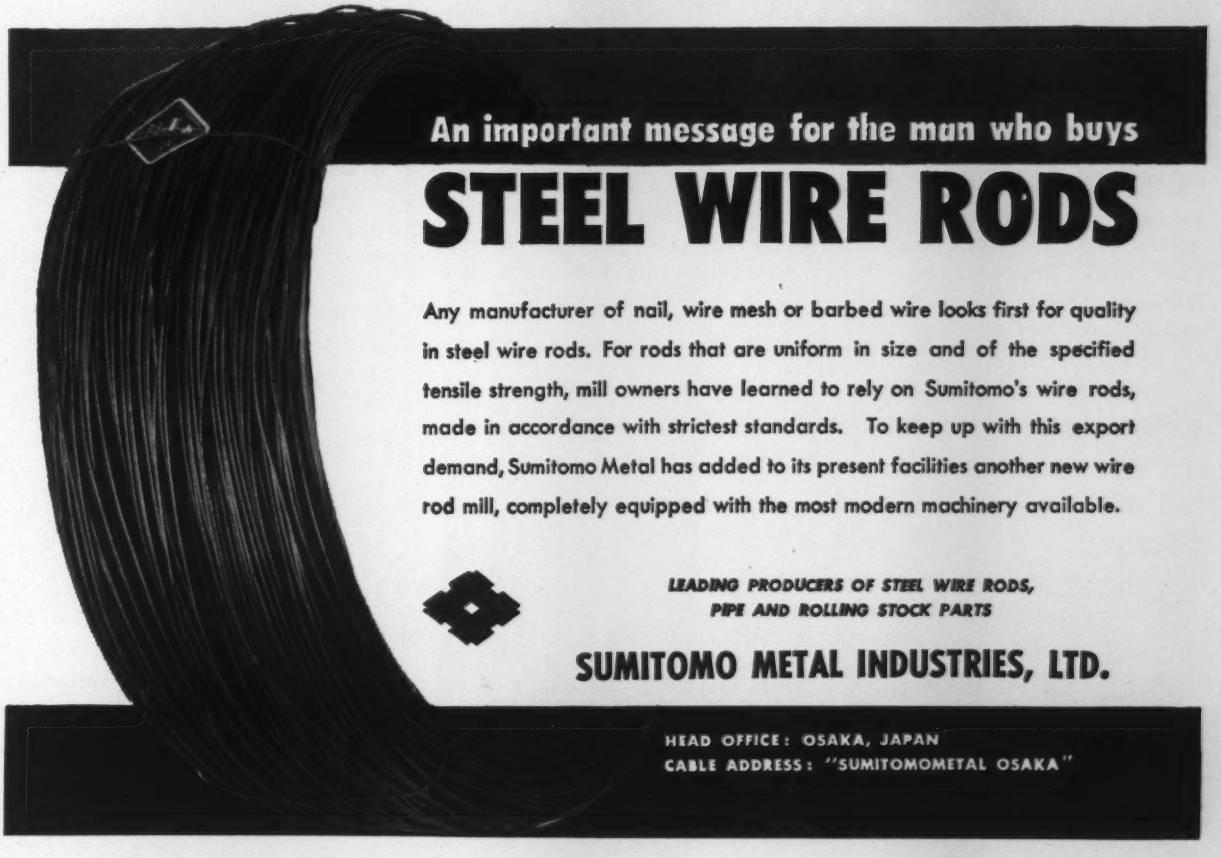


clamps are used, part size and contour are not limitations. Weight of the instrument is only 18 lb. (Steel City Testing Machines, Inc.)

For more data circle No. 84 on postcard, p. 89

Elevating Feeder

An elevating feeder, feeds and orients parts to processing or assembly machinery. Handling a variety of sizes, shapes, and materials, the elevating conveyor effects discharge to the right or left at desired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STEEL WIRE RODS
Any manufacturer of nail, wire mesh or barbed wire looks first for quality in steel wire rods. For rods that are uniform in size and of the specified tensile strength, mill owners have learned to rely on Sumitomo's wire rods, made in accordance with strictest standards. To keep up with this export demand, Sumitomo Metal has added to its present facilities another new wire rod mill, completely equipped with the most modern machinery available.
LEADING PRODUCERS OF STEEL WIRE RODS, PIPE AND ROLLING STOCK PARTS
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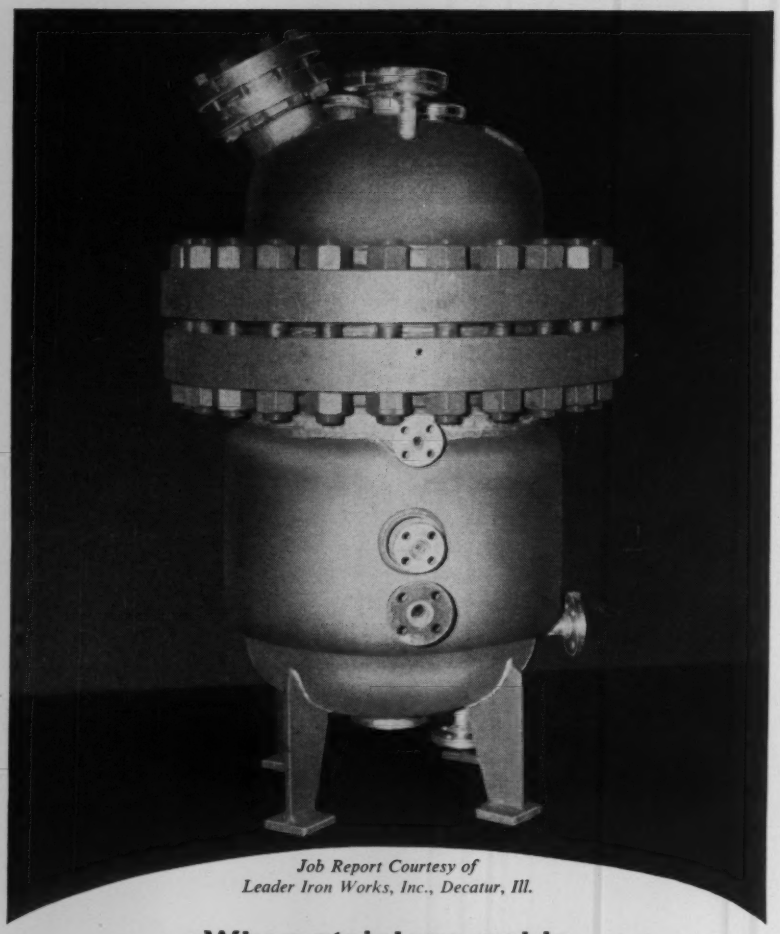


Job Report Courtesy of
Leader Iron Works, Inc., Decatur, Ill.

When stainless welds must also resist heat and pressure

This sturdy autoclave made of Type 316 stainless steel must operate under pressures up to 1000 psi at 600°F. Code specifications called for X-ray quality weld. To meet all these conditions for successful and long performance Arcos Chromend KMo (Type 316) electrodes were used for joint fabrication. When you use Arcos Stainless Electrodes you can always count on their providing multiple benefits.

WELD WITH ARCOS

STAINLESS ELECTRODES
for quality weld metal

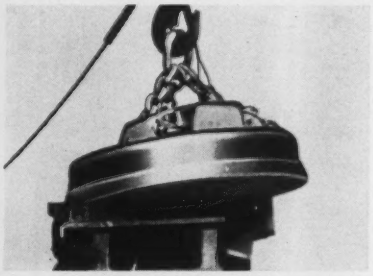
ARCOS CORPORATION • 1500 South 50th St., Philadelphia 43, Pa.

heights. The drive is either fixed or variable. Standard sizes are 6, 12, and 20 cu ft holding capacity. (Detroit Power Screwdriver Co.)

For more data circle No. 85 on postcard, p. 89

Lifting Magnets

A line of light-weight, heavy-duty scrap-metal lifting magnets features aluminum field coils, and rugged all-welded construction. The use of aluminum eliminates bulky insulation, and makes possible increased

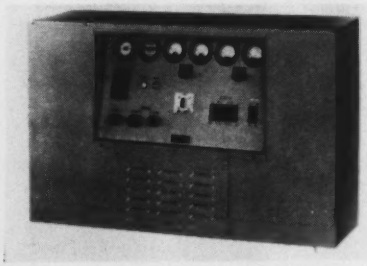


over-all efficiency. Features are: water-tight construction, replaceable pole shoes, and protected terminal box. The magnets are available in 36-, 39-, 45-, 55-, and 66-in. diam. (Stearns Magnetic Products)

For more data circle No. 86 on postcard, p. 89

Motor Alternator Sets

Motor-alternator packages provide stable ac line power, at either 60 cycles per second or 400 cycles per second (single or 3 phase); even when driven by erratic commercial power lines. Regulated in both fre-



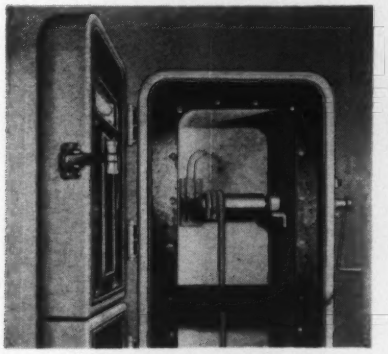
quency and voltage, the machines include brushless types, requiring practically no maintenance. All regulating circuitry is solid state. These precisely regulated sets, from 5 kw to 40 kw, are intended for electronic computers, industrial auto-

mation and processing equipment; also other large electronic systems requiring efficient stable power input. (Electric Specialty Co.)

For more data circle No. 87 on postcard, p. 89

Testing Chambers

Designed for testing wire and insulation breakdown, an environmental chamber consists of a one-piece cabinet, measuring 84-in. high, 20-in. wide, and 42-in. deep. The testing chamber, constructed of 14-gage galvanized steel, measures 12 x 12 x 72 in. A mandrel,



in the upper part of the chamber, holds one end of the wire to be tested, with the other end hanging free. The unit operates on 230 v and has a temperature adjustment from −10° to −80°F. Thermal capacity is 200 Btu/hr at −70°F. (Cincinnati Sub Zero Products.)

For more data circle No. 88 on postcard, p. 89

Blotting-Out Liquid

Matching corrugated cartons, an opaque, tan-colored liquid completely blots out old stenciling, labels, and painted markings. The liquid sprays out of an aerosol container. Transforming used cartons and crates into clean, new-looking containers, it permits quick re-stenciling and reuse of original containers. This quick-drying, waterproof material is a handy item in packing and shipping departments. (Reynolds Ink, Inc.)

For more data circle No. 89 on postcard, p. 89

Sling Machines

Slinger machines, with high-speed belts, hurl free-flowing bulk materials into inaccessible areas. These

Job Report Courtesy of
Ingersoll-Rand Co., Phillipsburg, N. J.

When low alloy welds must withstand 2000 psi

This centrifugal compressor is one of many used in offshore gas repressuring. The pressure of nearly 2000 psi is nearly twice the highest former working pressure. Arcos Tensilend 70 Electrodes were used to produce the high strength welds required. When *you* need sound, high strength weld metal, use Arcos Low Alloy quality controlled electrodes for reliable performance.

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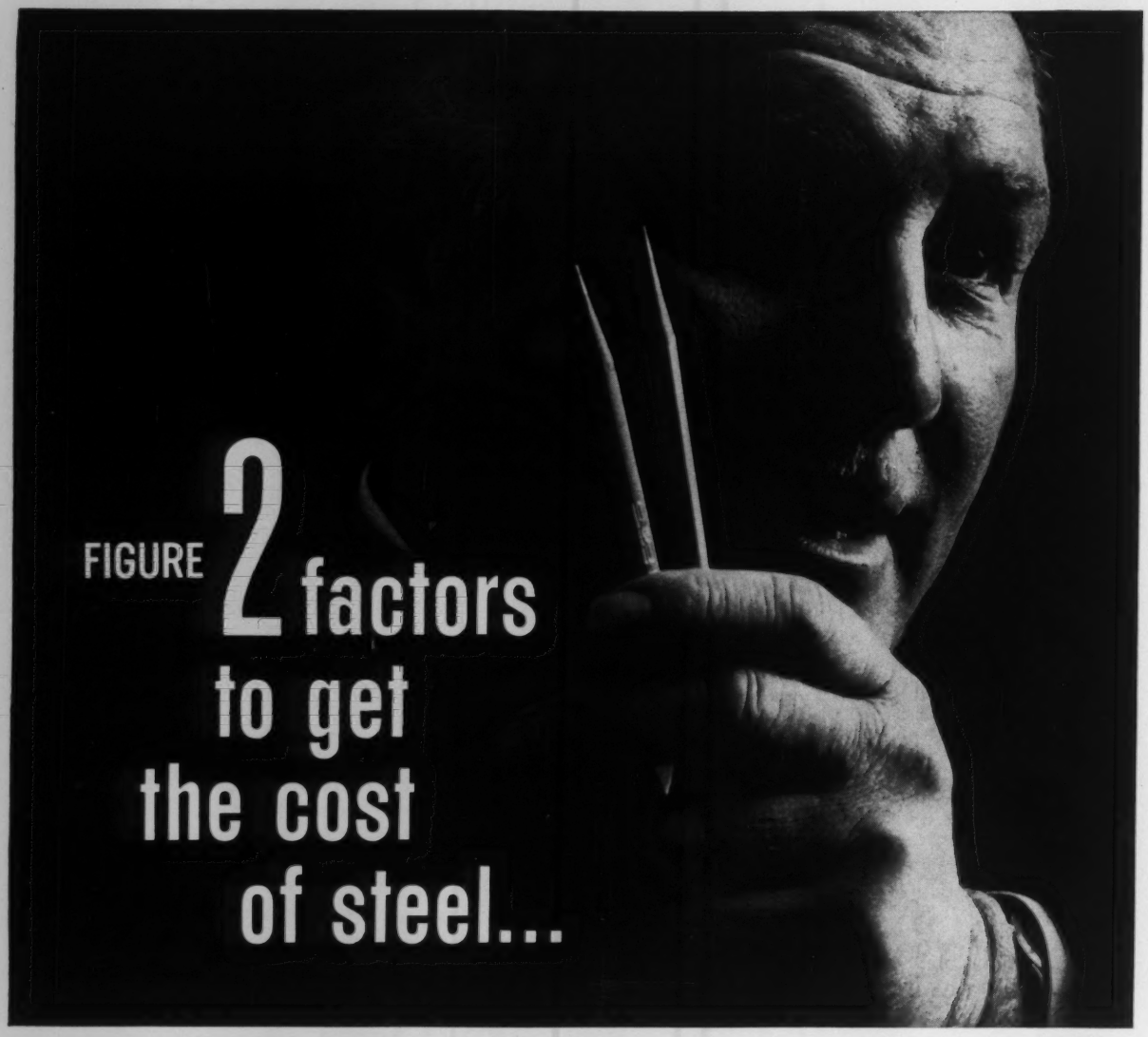

Price and the **COST OF POSSESSION!**

Take a look at the chart at the right. These are the additional items that determine your *total* cost of steel.

If you are buying more than three months' requirements, consider drawing on the inventory of your Steel Service Center. You'll get steel when you want it, delivered, cut-to-size, ready for production. Technical assistance is yours, too, if you need it.

If you're placing steel in inventory because you think it's a bargain, compare *all* of your costs, including *cost of possession*, with the price and *freedom from risk* of buying from your Steel Service Center.

Get the booklet, *What's Your Real Cost of Possession for Steel?* from your nearby Steel Service Center. Or write to Steel Service Center Institute, Inc., 540-D Terminal Tower, Cleveland 13, Ohio.

COST OF POSSESSION FOR STEEL IN YOUR INVENTORY

Per ton delivered	_____
Cost of capital:	
Inventory	_____
Space	_____
Equipment	_____
Cost of operation:	
Space	_____
Materials handling	_____
Cutting & burning	_____
Scrap & wastage	_____
Other costs:	
Obsolescence	_____
Insurance	_____
Taxes	_____
Accounting	_____
TOTAL	_____

COST OF FREEDOM-FROM-RISK STEEL FROM YOUR STEEL SERVICE CENTER

Per ton, cut-to-size, and delivered

TOTAL _____

STEEL SERVICE CENTER INSTITUTE

...YOUR STEEL SERVICE CENTER

high-speed units trim ships, load boxcars and trucks, or stockpile material in warehouses or outdoor storage. Three models are available, consisting of a suspended, swiveling unit and two portable, wheel-mounted units. The units come in belt widths of 14, 20, and 28 in., and have capacities of up to 700 tons per hour for materials weighing 50 lb per cu ft. They can hurl materials as far as 90 ft, and pile it to a height of 35 ft above the discharge point. (Link-Belt Co.)

For more data circle No. 90 on postcard, p. 89

Ingot Grab

Handling metal slabs, a low-headroom grab picks up and stacks ingots. The machine grips the long dimension of the slab which is held by gripping points on the legs of the grab. The jaws of the unit slide down on its legs, and the ingot may be rotated 90° from a horizontal position. Also, it can be picked up on one side or another and rotated 90°. The ingot grab is fully automatic, alternately gripping and releasing the load. No workman is required, except to guide the slab into position when placing it at rest. (Mansaver Industries, Inc.)

For more data circle No. 37 on postcard, p. 89

Hammer-Style Holder

Used for marking with steel character dies, a hammer-style holder features self-alignment. The holder allows the stamping of clear markings by compensating for slope or other irregularity of the marking surface. The anvil is properly heat treated for long life, and is replaceable, thus extending the useful life of the holder itself. The holder features a device that locks in place or releases for changing the number or letter dies. (Pannier Corp.)

For more data circle No. 38 on postcard, p. 89

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MACWHYTE Wire Rope COMPANY

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The Iron Age Summary

Estimates Revised—Downward

Inventory buildup will be over in the second quarter. As a result, the steel operating rate will head into the low 80's.

Estimates for annual production have been cut back.

■ The steel market has returned to normal, with users placing orders to meet their production needs.

Most consumers have either workable inventories on hand or enough orders placed to cut the danger of production cutbacks.

Drop Ahead—Moderate inventory accumulation will continue into April or May. But after that, steel orders may be below the rate of consumption. As a result, a steel operating rate of 80 pct of capacity can be expected in the third quarter.

Second quarter operations will average between 84 and 88 pct, and could slide off to as low as 82 pct by the end of the period.

Estimate Revised — Because of the expected slowdown of production, The IRON AGE has revised its estimate of steep production for the year to 120 million to 125 million ingot tons. This is down from original estimates of 127 million to 130 million tons.

But the revised estimate is well over the previous record steel output of 117 million tons set in 1955.

Steel consumption is still at a high rate. But because of record shipments and some business uncertainty, users are taking their time in ordering steel. In addition, deferments and cutbacks in orders are becoming more frequent.

Regional Factors—The market has now taken on a regional note. Cutbacks have been more serious in Chicago, which only recently was the tightest market area. On the other hand, Cleveland, with a heavy automotive market, is one of the strongest. To date, automotive cancellations have had little effect, although this situation may change rapidly.

What will happen to auto production in March and April may hold the key to the steel market. February production will hit about 650,000 cars. This is well under original schedules of 725,000. However, auto sales are running 12 pct over a year ago and the present weekly rate is 16 pct ahead of 1959.

Ordering Delayed—But the cutbacks will take their toll in the steel market and several automotive divisions have curtailed operations in the past week. For the most part, automakers have delayed placing their tonnage to the last minute, waiting for an inkling of spring market trends.

One sideline of expected lower operations: Operating men are anxious to get started on long-overdue maintenance. Since the end of the strike, mills have been operating at close to capacity and some facilities are badly in need of overhaul.

Mills which have dropped behind on deliveries are now more current. But there is less and less complaint about carryovers. Cold-rolled sheets are far from soft, but second quater space is available in most areas.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,693	2,693	2,736	2,506
Ingot Index				
(1947-1949=100)	167.5	167.5	170.2	156.0
Operating Rates				
Chicago	97.0	97.0	95.0	90.0
Pittsburgh	96.0	98.0	97.0	86.5
Philadelphia	94.0	96.0*	102.0	94.5
Valley	88.0	87.0*	92.0	91.5
West	92.5	90.0	89.0	86.0
Cleveland	99.0	98.5*	97.0	91.0
Detroit	100.0	101.0	107.0	93.0
Buffalo	105.0	105.0	105.0	102.0
South Ohio River	100.5	100.0	97.0	95.0
South	83.0	83.0*	93.5	81.0
Upper Ohio River	96.0	95.0	91.5	95.0
St. Louis	96.0	96.0	97.0	85.0
Aggregate	94.5	94.5	96.0	88.5

*Revised

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$37.17	$39.17	$42.50	$43.17
No. 2 bundles	$23.50	$25.17	$28.50	$30.33
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	26.80
Copper, electrolytic	33.00	33.00	33.00	30.00
Lead, St. Louis	11.80	11.80	11.80	11.30
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	102.25	101.875	100.375	103.75
Zinc, E. St. Louis	13.00	13.00	13.00	11.50

New Methods Mean Better Policy

A cooperative approach is necessary in meeting changing purchasing needs.

W. G. Blessing, Blaw-Knox Co., has used this to develop a sound buying system.

▪ "You have to keep changing," says W. G. Blessing, director of purchases, Blaw-Knox Co. "You wouldn't drive a car that was 15 years old; you can't ride along with the same old methods year in and year out."

Mr. Blessing feels a cooperative approach is essential in meeting changing needs. His aim has been to promote broad participation in the development of new purchasing methods.

Thorough Testing—This thinking has been thoroughly tested at Blaw-Knox. The company has been expanding steadily in recent years in its basic lines of steel mill equipment and in the chemical and utility equipment fields.

For purchasing, this growth has meant new staff responsibilities and new problems of consolidation. In 1956 a central purchase department was set up to handle major buying for the 10 plants that make rolling mill equipment and related products. This central group processes over 2900 orders a month. It buys about half the company's purchased goods.

Staff Aid—For the eight plants of its fabricated products group and for the chemical plant division, Blaw-Knox has kept the purchasing function decentralized. The headquarters group gives staff aid; direct buying is done by the plants.

Important methods revisions have gone along with organization changes. Blaw-Knox was among the first to adopt blanket orders for common and low-value items. The company's system of traveling requisitions has proved an effective buying and inventory control. Week-to-week checks have been established for stocks of ferroalloys and other high value items.

The Younger Men—This background of transition and progress has given Mr. Blessing very definite ideas on the manner of approaching new methods.

"You must bring your younger men into the development of methods and routines," he says. "Otherwise, you'll kill their interest."

Apart from its effect on job performance, he feels a policy of remote management can leave many problems un-noticed and unsolved.

"A department head can't possibly see all the problems under him. He must get ideas and suggestions from those closest to specific operations."

Used Effectively—These are not just nice-sounding sentiments with Mr. Blessing. His department has taken specific steps to secure an upward flow of ideas. Twice each month committees within the department meet to discuss objectives and methods. Committee members are drawn from all purchasing levels. Mr. Blessing sits in on one meeting of every committee each month.

"You can't have mass management," says Mr. Blessing, "but you can make full use of available talent."

For the immediate future, Mr. Blessing sees fairly stable supply. His own company has no general problems of steel supply. Like other purchasing men, he was surprised at the speed of the steel recovery.

W. G. BLESSING: "Make full use of available talent."

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Raw materials available?

Right process chosen?

Location correct?

Capacity adequate?

Economically sound?

Readily financed?

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Delivery Promises Close to Normal

The delivery situation is easing for many products and some mills offer normal leadtime for delivery.

Record and near-record production since the end of the strike has made the rapid recovery possible.

▪ Mill delivery promises are rapidly returning to normal. In some areas, many products already carry a promise of normal or even better-than-normal delivery (See table, below).

The comeback has been aided by the steel industry's remarkable recovery from the steel strike. Last month, U. S. blast furnaces set a new production record of 7.83 million net tons of pig iron and ferroalloys, according to the American Iron and Steel Institute. And December output was a near record 7.64 million net tons. The former high of 7.75 million net tons was set in May, 1959.

Easiest in West—The situation is easiest in the Chicago and Detroit districts where automakers and other large users have begun to ease pressure on the mills. Setbacks and some cancellations have been received by the mills recently, creating holes in order books, as manufacturers pause to review market and inventory situations.

A tight situation still exists in Cleveland, however, particularly for flat-rolled products where mill delivery promises stretch out from two to three months.

East Coast and Pittsburgh mills are now promising delivery on flat-rolled products only one to two weeks later than normal. Many other products are now available within normal leadtimes.

Sheet and Strip—There's a noticeable easing in availability of sheet and strip where a tight situation existed only a few weeks ago. Big Three automakers have cancelled some tonnage on the books of **Midwest** mills. Setbacks have been more noticeable, with appliance and farm equipment companies joining automakers in pushing back March tonnage into April and May. While there has been a small cancellation in **Cleveland** by an automaker, the market is still fairly tight. The demand for hot-rolled sheets has slowed in **Detroit.** A month ago users were pressuring mills for this product.

Bars—Standard bars are being quoted for April delivery in **Cleveland,** but anything special would probably go into May. There hasn't been much softening in **Detroit** where one steel company reports it is oversold through April. However, little is known about the outlook for the rest of the quarter. Only a few small orders have been placed for May and June, none by the automakers. Cold-finished bars are holding well in the **Midwest.** But mills figure they'll have cleaned out all work presently on the books. As new bookings have dropped off, mills expect to shorten delivery promises within a few weeks.

Wire—The first signs of a seasonal pickup in merchant wire products is beginning to show up in **Cleveland.** At the same time, the automobile and furniture industries have not shown any signs of slackening their demand.

Plate and Shapes—Demand for plate continues to weaken on the **East Coast** where fabricators are still looking for some business. The same situation is beginning to show up in the **Midwest** where demand for light plate has eased in the past few weeks. Warehouses have cut back orders as customers tell them they intend to reduce their purchases in April. Structural salesmen are starting to beat the bushes, too. While they haven't been hit by cut backs yet, they are looking at the plate market and expect a similar reaction in the coming weeks.

Delivery Promises at a Glance

	East	Pittsburgh	Cleveland	Detroit	Chicago	West Coast
CR Carbon Sheet	8–10 wks	8–10 wks	12–14 wks	6–10 wks	5–8 wks	10 wks
HR Carbon Sheet	7–9 wks	7–9 wks	12–14 wks	4–6 wks	5–6 wks	4–6 wks
CR Carbon Strip	8–10 wks	8–10 wks	12–14 wks	6–10 wks	5–6 wks	10 wks
HR Carbon Strip	7–9 wks	7–9 wks	12–14 wks	4–6 wks	6–8 wks	6 wks
HR Carbon Bars	8–10 wks	7–9 wks	8–10 wks	4–8 wks	5–8 wks	1–2 wks
CF Carbon Bars	7–9 wks	4–8 wks	6–7 wks	6–10 wks	6–8 wks	2–4 wks
Heavy Plate	4–6 wks	5–7 wks			5–7 wks	8–10 wks
Light Plate	4–6 wks	5–7 wks	12–14 wks		4–6 wks	8–10 wks
Merchant Wire	2–3 wks	Stock	6–8 wks		Stock–4 wks	2 wks
Oil Country Goods	4–6 wks	1–4 wks	10–12 wks		4–6 wks	
Linepipe	2–6 wks	1–4 wks	3–5 wks		8–12 wks	10 wks
Buttweld Pipe	Stock	1–2 wks	3–5 wks	Stock	4–6 wks	2 wks
Std. Structurals	6–8 wks	5–7 wks	8–10 wks	10–12 wks	4–5 wks	4 wks
CR Stainless Sheet	2–5 wks	Stock–6 wks	3–5 wks	4–6 wks		
CR Stainless Strip	3–5 wks	Stock–6 wks	3–5 wks	2–5 wks		

COMPARISON OF PRICES

(Effective Feb. 23, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Feb. 23 1960	Feb. 16 1960	Jan. 26 1960	Feb. 24 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.00	14.00**	14.00**	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Feb. 23 1960	Feb. 16 1960	Jan. 26 1960	Feb. 24 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	11.00	11.00	11-12½	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$38.50*	$40.50	$44.50	$46.50
No. 1 steel, Phila. area	37.50*	39.50	41.50	39.50
No. 1 steel, Chicago	35.50*	37.50	41.50	43.50
No. 1 bundles, Detroit	34.50*	37.50	40.50	39.50
Low phos., Youngstown	43.50*	45.50	49.00	49.50
No. 1 mach'y cast, Pittsburgh	55.50	55.50	55.50	51.50
No. 1 mach'y cast, Phila.	52.50	52.50	54.50	56.50
No. 1 mach'y cast, Chicago	56.50*	57.50	62.50	57.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$37.17*	$39.17	$42.50	$43.17
No. 2 bundles	23.50*	25.17	28.50	30.33
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	$14.75-15.50	$14.75-15.50	$14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	33.00	30.00
Copper, Lake, Conn.	33.00	33.00	33.00	30.00
Tin, Straits, N. Y.	102.25*	101.875	100.375	103.75
Zinc, East St. Louis	13.00	13.00	13.00	11.50
Lead, St. Louis	11.80	11.80	11.80	11.30
Aluminum, virgin ingot	28.10	28.10	28.10	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites
Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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Limited Buys Drop Prices Again

Dealers are discouraged as mills continue showing little interest in buying.

Prices fall on limited purchases of small tonnages.

■ Scrap buyers and sellers continue playing hide and seek, with the buyers doing the hiding.

The lack of mill or broker interest keeps pushing prices down. Dealers are gloomy about the future, seeing little real prospect of improvement. Only large-scale buying would liven up the market. And there's little hope this would strengthen prices.

When mills buy, it's often on the basis of single car orders. From week to week, the prices offered for this tonnage are declining. And trading is at a minimum.

Watch and Wait—Many dealers seem resigned to riding out the downturn. Buyers will have to work down existing scrap supplies before sales improve, dealers say.

How weak the market actually is will be determined this week when auto lists close. Tonnages are expected to be heavy, but possibly below January's record amounts.

Pittsburgh—Prices continue drifting downward as mills and brokers remain out of the market. Local dealers are resisting prices offered by mills. The flow of bundles from the east has stopped. Area mills are offering $36 for No. 1 heavy melting and $26 for No. 2 bundles. There's not enough trading to set the price levels at which scrap will move and the mills will buy. Because of uncertainty about the market, big scrap yards have not moved to replace scrap which has been sold in the past three months.

Chicago — Prices went on slipping. Broker offers to sell at $2 below previous prices brought little mill interest. Mills are placing few additional orders. The price break for the first time extended into stainless grades. The stainless price drop was only $2.50 a ton on top quality grades. But it is expected to set the stage for further price deceases.

Philadelphia — Prices on prime steelmaking grades dropped again, down $2 a ton. Other grades also declined. Dealers are gloomy and further price drops are expected. Mills are taking in only single car orders on a weekly basis. Foundry scrap buying is steady, but also limited. Export has shown no new activity. Dealers and brokers don't look for any improvement until mill supplies are used up and volume buying returns.

New York — The only activity in steelmaking grades is for export sale. Domestic prices of openhearth grades are off $1 a ton on appraisal. The top price for No. 1 heavy melting is now $32 a ton. Old orders for blast furnace and foundry grades sustain existing prices.

Detroit — Prices are still sliding and expected to continue on the downside. Some dealers are making a move to put scrap on the ground, prepare it, and stockpile it until the market improves.

Cleveland — The market settled down another $1 a ton as dealer material goes begging. Offerings of scrap below market prices are not arousing any buyer interest. Dealers are about ready to sell at any price. Secondary grades and turnings are piling up in dealer yards. Auto lists are expected to decline. Tonnage will be below February's high levels.

St. Louis — Mill resistance pushed prices lower in this area. Heavy supplies of scrap are also depressing the market. Mills will listen to asking prices, but then make a counter offer at lower prices. Usually they want only a portion of the tonnage offered.

Cincinnati — Dealers are already wondering whether area mills will buy in March. At the moment, a flood of scrap has shut off local shipments. Sellers can make up-river shipments, but at a $2 a ton sacrifice. On this basis, few sales are made.

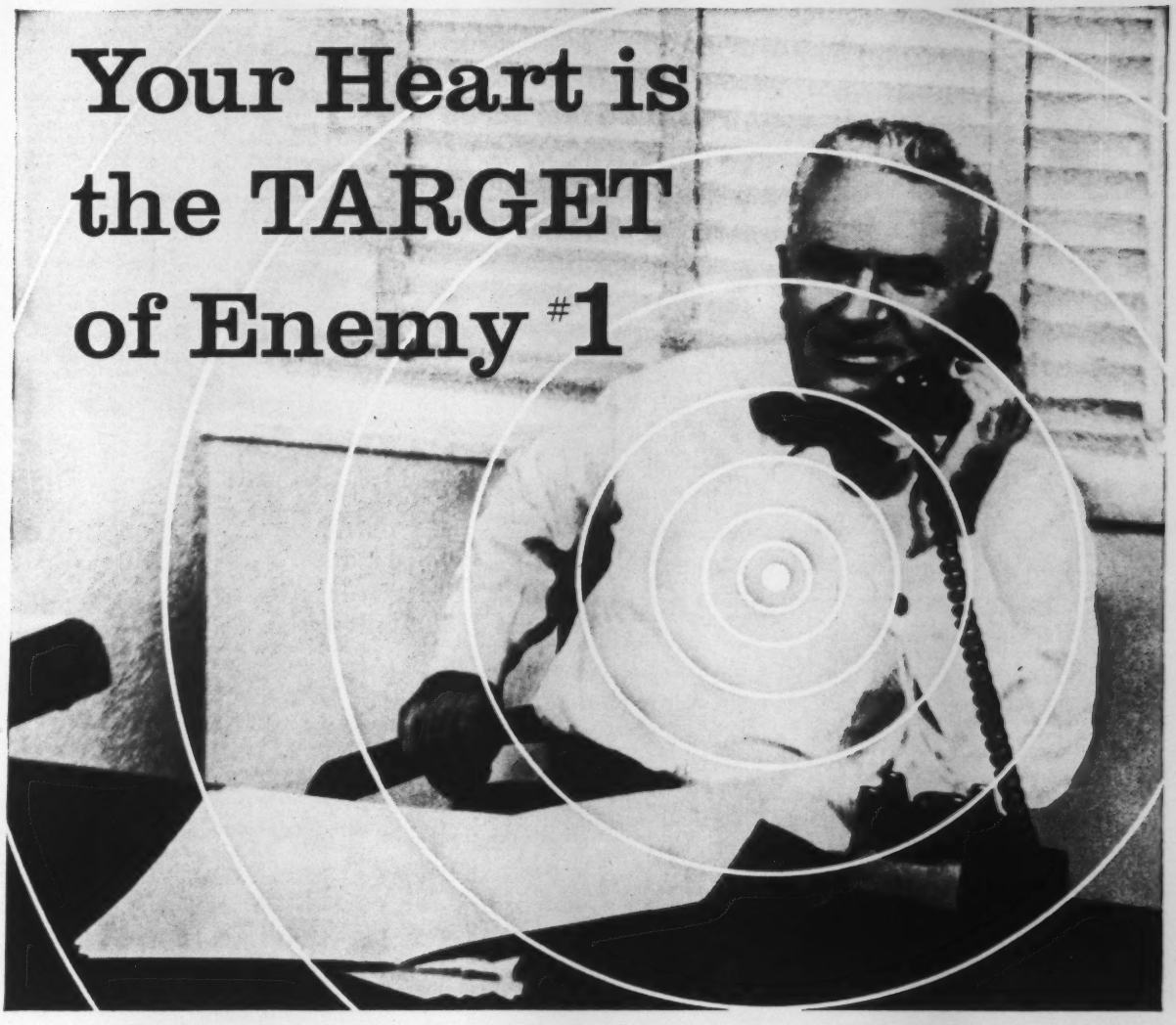
Birmingham — Consumers are living off inventories and show no haste to buy. Prices are off $1 a ton on the items which are moving. Brokers expect them to go even lower when buying is resumed. The export market is quiet with prices unchanged.

Buffalo — Market remains inactive except for small shipments on old orders. There have been no more new sales. But prices dropped $1 a ton on the weak tone of the market.

Boston — Trading is virtually at a standstill. The market is drab with little domestic or export activity. Prices fell, mostly in sympathy with the drop in other markets. No. 1 heavy melting, No. 1 bundles, and No. 1 busheling are all down $2 a ton.

West Coast — There are few signs of life in the market. New export orders are eagerly awaited. If the present trend continues, some dealers expect another $2 to $3 a ton drop in prices.

Houston—Prices on steelmaking grades dropped $2 a ton on small tonnage buying. The cast market is inactive. Export sales are also slow.



You might work at a lathe, on a tractor, behind a counter, behind a desk. It makes no difference. No one is immune to the heart diseases, our nation's #1 health enemy.

Your Heart Fund is your #1 defense. Your contributions support heart research. You make it possible for your Heart Association to bring the latest research advances to your physician—and to protect your heart and all the hearts you love.

GIVE TO HEART FUND ® FIGHT HEART DISEASE

SCRAP PRICES *(Effective Feb. 23, 1960)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 dealer bundles	40.00 to 41.00
No. 1 factory bundles	47.00 to 48.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	38.00 to 39.00
Machine shop turn.	22.00 to 23.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	26.00 to 27.00
Low phos. punch'gs plate	48.00 to 49.00
Heavy turnings	34.00 to 35.00
No. 1 RR hvy. melting	44.00 to 45.00
Scrap rails, random lgth.	57.00 to 58.00
Rails 2 ft and under	63.00 to 64.00
RR specialties	55.00 to 56.00
No. 1 machinery cast.	55.00 to 56.00
Cupola cast.	50.00 to 51.00
Heavy breakable cast.	48.00 to 49.00
Stainless	
18-8 bundles and solids	230.00 to 235.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	125.00 to 130.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 dealer bundles	35.00 to 36.00
No. 1 factory bundles	38.00 to 39.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	19.00 to 20.00
Low phos. forge crops	50.00 to 51.00
Low phos. punch'gs plate, ¼ in. and heavier	46.00 to 47.00
Low phos. 2 ft and under	43.00 to 44.00
No. 1 RR hvy. melting	38.00 to 39.00
Scrap rails, random lgth.	50.00 to 51.00
Rerolling rails	59.00 to 60.00
Rails 2 ft and under	57.00 to 58.00
Angles and splice bars	49.00 to 50.00
RR steel car axles	55.00 to 56.00
RR couplers and knuckles	46.00 to 47.00
No. 1 machinery cast.	56.00 to 57.00
Cupola cast.	48.00 to 49.00
Cast iron wheels	44.00 to 45.00
Malleable	58.00 to 59.00
Stove plate	45.00 to 46.00
Steel car wheels	46.00 to 47.00
Stainless	
18-8 bundles and solids	215.00 to 222.50
18-8 turnings	115.00 to 120.00
430 bundles and solids	115.00 to 120.00
430 turnings	55.00 to 60.00

Philadelphia Area

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	41.00 to 42.00
Machine shop turn.	20.00 to 21.00
Mixed bor. short turn.	21.00 to 22.00
Cast iron borings	20.00 to 21.00
Shoveling turnings	24.00 to 25.00
Clean cast. chem. borings	25.00 to 26.00
Low phos. 5 ft and under	42.00 to 43.00
Low phos. 2 ft punch'gs	44.00 to 45.00
Elec. furnace bundles	42.00 to 43.00
Heavy turnings	31.00 to 32.00
RR specialties	48.00 to 49.00
Rails, 18 in. and under	66.00 to 67.00
Cupola cast.	41.00 to 42.00
Heavy breakable cast.	44.00 to 45.00
Cast iron car wheels	48.00 to 49.00
Malleable	65.00 to 66.00
No. 1 machinery cast.	52.00 to 53.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	21.00 to 22.00
Low phos. 18 in. and under	45.00 to 46.00
Rails, random length	51.00 to 52.00
Rails, 18 in. and under	56.00 to 57.00
No. 1 cupola cast.	47.00 to 48.00
Hvy. breakable cast.	39.00 to 40.00
Drop broken cast.	54.00 to 55.00

Youngstown

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	33.50 to 34.50
No. 1 dealer bundles	42.00 to 43.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	18.50 to 19.50
Shoveling turnings	23.50 to 24.50
Low phos. plate	43.00 to 44.00

Cleveland

No. 1 hvy. melting	$38.50 to $39.50
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	38.50 to 39.50
No. 1 factory bundles	42.00 to 43.00
No. 2 bundles	20.50 to 21.50
No. 1 busheling	38.50 to 39.50
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	20.00 to 21.00
Cut structural & plates, 2 ft & under	46.00 to 47.00
Drop forge flashings	38.50 to 39.50
Low phos. punch'gs plate	39.50 to 40.50
Foundry steel, 2 ft & under	40.00 to 41.00
No. 1 RR hvy. melting	45.00 to 46.00
Rails 2 ft and under	60.00 to 61.00
Rails 18 in. and under	61.00 to 62.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	57.00 to 58.00
No. 1 machinery cast.	55.00 to 56.00
Stove plate	48.00 to 49.00
Malleable	62.00 to 63.00
Stainless	
18-8 bundles	215.00 to 225.00
18-8 turnings	100.00 to 110.00
430 bundles	120.00 to 125.00

Buffalo

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 busheling	34.00 to 35.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	18.00 to 19.00
Low phos. plate	42.00 to 43.00
Structurals and plate, 2 ft and under	42.00 to 43.00
Scrap rails, random lgth.	40.00 to 41.00
Rails 2 ft and under	50.00 to 51.00
No. 1 machinery cast.	50.00 to 51.00
No. 1 cupola cast.	46.00 to 47.00

St. Louis

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 dealer bundles	39.00 to 40.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	25.00 to 26.00
No. 1 RR hvy. melting	42.00 to 43.00
Rails, random lengths	47.00 to 48.00
Rails, 18 in. and under	51.00 to 52.00
Angles and splice bars	47.00 to 49.00
RR specialties	43.00 to 45.00
Cupola cast.	51.00 to 52.00
Heavy breakable cast.	40.00 to 41.00
Stove plate	42.00 to 43.00
Cast iron car wheels	43.00 to 44.00
Rerolling rails	60.00 to 61.00
Unstripped motor blocks	44.00 to 45.00

Birmingham

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	41.00 to 42.00
Machine shop turn.	23.00 to 24.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	14.00 to 15.00
Electric furnace bundles	41.00 to 42.00
Elec. furnace, 3 ft & under	38.00 to 39.00
Bar crops and plate	44.00 to 45.00
Structural and plate, 2 ft.	43.00 to 44.00
No. 1 RR hvy. melting	38.00 to 39.00
Scrap rails, random lgth.	51.00 to 52.00
Rails, 18 in. and under	56.00 to 57.00
Angles and splice bars	49.00 to 50.00
Rerolling rails	58.00 to 59.00
No. 1 cupola cast.	53.00 to 54.00
Stove plate	53.00 to 54.00
Cast iron car wheels	44.00 to 45.00
Unstripped motor blocks	42.00 to 43.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	22.00 to 23.00
No. 2 dealer bundles	16.00 to 17.00
Machine shop turnings	11.00 to 12.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	15.00 to 16.00
Clean cast. chem. borings	22.00 to 23.00
No. 1 machinery cast.	39.00 to 40.00
Mixed yard cast.	36.00 to 37.00
Heavy breakable cast.	37.00 to 38.00
Stainless	
18-8 prepared solids	200.00 to 205.00
18-8 turnings	85.00 to 90.00
430 prepared solids	85.00 to 90.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	19.00 to 20.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	33.00 to 34.00
Drop forge flashings	33.00 to 34.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	15.00 to 16.00
Heavy breakable cast.	38.00 to 39.00
Mixed cupola cast.	45.00 to 46.00
Automotive cast.	50.00 to 51.00
Stainless	
18-8 bundles and solids	210.00 to 215.00
18-8 turnings	80.00 to 85.00
430 bundles and solids	95.00 to 100.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	10.00 to 11.00
Shoveling turnings	15.50 to 16.50
Clean cast. chem. borings	14.50 to 15.50
No. 1 machinery cast.	40.00 to 41.00
Mixed cupola cast.	34.00 to 35.00
Heavy breakable cast.	34.50 to 35.50

San Francisco

No. 1 hvy. melting	$38.00
No. 2 hvy. melting	34.00
No. 1 dealer bundles	34.00
No. 2 bundles	22.00
Machine shop turn.	17.00
Cast iron borings	$17.00 to 18.00
No. 1 cupola cast.	46.00

Los Angeles

No. 1 hvy. melting	$38.00
No. 2 hvy. melting	35.00
No. 1 dealer bundles	34.00
No. 2 bundles	20.00
Machine shop turn.	$17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Elec. furn. 1 ft and under (foundry)	49.00
No. 1 cupola cast.	45.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

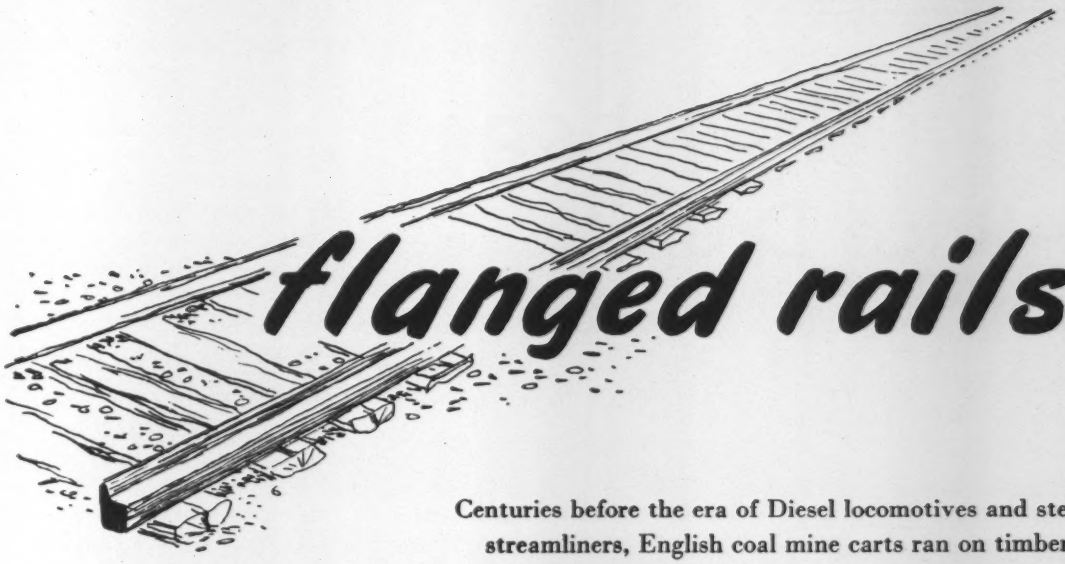
Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.25
No. 2 hvy. melting	28.25
No. 1 dealer bundles	32.25
No. 2 bundles	24.00
Mixed steel scrap	24.25
Bush., new fact., prep'd.	32.25
Bush., new fact., unprep'd	26.25
Machine shop turn.	14.00
Short steel turn.	17.00
Mixed bor. and turn.	13.00
Cast scrap	$46.50 to 48.00

Houston

Brokers buying prices per gross ton on cars:

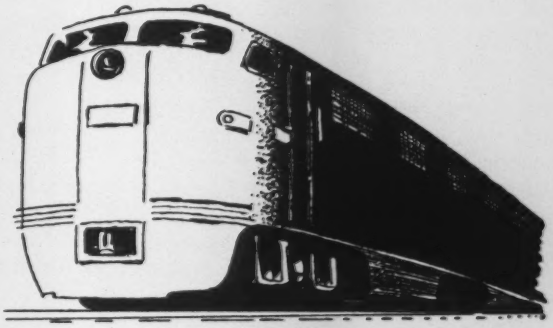
No. 1 hvy. melting	$37.00
No. 2 hvy. melting	34.00
No. 2 bundles	23.00
Machine shop turn.	16.00
Shoveling turnings	20.00
Cut structural plate 2 ft & under	$46.00 to 47.00
Unstripped motor blocks	34.00 to 35.00
Cupola cast.	42.00 to 43.00
Heavy breakable cast.	31.00 to 32.00



flanged rails

Centuries before the era of Diesel locomotives and steel streamliners, English coal mine carts ran on timbers. In 1776, "improved" rails of cast iron were produced in Coalbrookdale, England, with an inside flange some 3 inches above the path of the wagon wheel. These rails, laid on cross sleepers or longitudinal sills, proved unsatisfactory, however, because dirt collected on the surface and caused hard traction.

Now, thousands of miles of steel rails crossing and criss-crossing the continent assure fast, smooth transportation. To maintain the vast facilities and equipment of the nation's railroads, and for thousands of other civilian and military requirements, an unfailing supply of steel is vital. And scrap is demanded in tens of thousands of carloads.



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231 S. La Salle St., Chicago

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Copper Users Hope For Price Drop

Post-strike demand for copper and copper products has not materialized.

Most sources believe price is the big factor and buyers are waiting for copper to drop.

▪ The lack of new demand for copper and copper alloy mill shapes following the end of major copper strikes isn't bothering the brass mills.

"It looks a little discouraging at times," admits the head of one major mill, "But I still think we're going to have a good year."

In the Middle—Brass mills are squarely in the center of the copper market, and most sensitive to conditions. They supply fabricated copper and mill shapes to end users, and, as such, are one of the biggest buyers of primary copper.

"Our customers sense that the copper price is more likely to go down than up," says this brass mill president. "They're not rebuilding their inventories under those circumstances. In fact, they're skimping wherever possible."

Well Stocked—How well are the mills fixed on their own stocks of copper and semi-finished shapes? "We're able to keep our customers reasonably happy," said one mill spokesman.

Few, if any, mills are forced to turn down orders. The market appraisal of the sales head of a major copper producer pretty well agrees with the brass mills. "Our business is good," he reports. "We could probably sell more than what we have." But he notes no real buildup in demand.

"I don't expect the price to go up," he said.

Second Quarter Hopes — Both mills and producers pretty much agree that the whole situation will be resolved in the second quarter. A mill spokesman estimates that if the market holds its current plane for another month, demand from customers is almost sure to pick up.

And a representative for a producer suggests that, when the pipeline between smelters and mills starts flowing regularly again, there'll be plenty of copper to go around. When will this be? In the second quarter, he figures.

An experienced copper man says demand is good, but at a price. "People need copper," he says, "but not bad enough to pay premiums to brokers and speculators." Many major users are in good enough shape to restrict buying and keep the pressure off the market until things loosen up, he figures.

Washington sources report the clamor for release of government DPA stockpile copper has calmed down considerably.

Aluminum

The 94-year-old Bridgeport Brass Co. is shifting its emphasis to aluminum.

This is revealed in its year-end statement, which also reports record earnings and sales for 1959.

Bridgeport president Austin R. Zender says a company study indicates that, during its long-range expansion and plant improvement program, only a normal market growth is likely for copper and brass. But, he says, "a substantial increase in the use of aluminum is indicated."

The year-end statement explains: "Present consumption of approximately two million tons of aluminum per year is predicted to double by 1965, which is the year Bridgeport's plans to reach top capacity for the production of this metal are scheduled to be completed."

Looking further ahead, Mr. Zender expects demand to increase by another 100 pct between 1965 and 1975.

Bridgeport will concentrate its effort in upping sheet, plate and strip capacity which, it says, takes 50 pct of the aluminum market.

Aluminum for Siding—Residential siding will use more than 180 million lb of aluminum annually by 1963, predicts Thomas J. Lannen, manager of residential sales, Aluminum Co. of America.

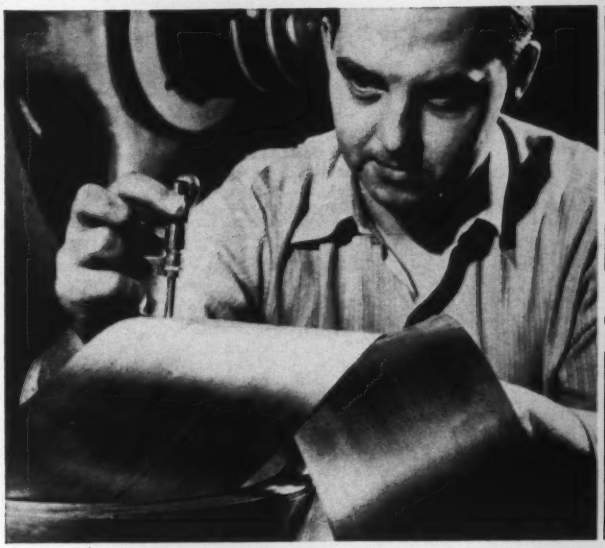
Alcoa figures use of aluminum residential siding has grown about 482 pct between 1950 and 1959. Last year, the total was 110.6 million lb, compared to 19 million lb in 1950.

Tin prices for the week: Feb. 17—101.75; Feb. 18—102.125; Feb. 19—102.125; Feb. 23—102.25.*
*Estimate.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	26.00	24.70	12/17/59
Aluminum ingot	28.10	26.80	12/17/59
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	35.00	33.00	12/23/59
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/58
Titanium sponge	150-180	162-182	8/1/59
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; Other primary prices, pg. 167.



Dedicated Craftsmanship is Foremost...

at Bristol Brass...

Many innovations have occurred since the 18th century when deft artisans with simple tools "custom-tailored" brass with outstanding precision. On this ever-changing scene, however, are certain types of operations which require the skill, the patience, the integrity of the 18th century artisan.

Brass from Bristol combines the careful craft of the 18th century artisan with the 1960 facilities and production skills of mill wisemen who can tell by touch, sight and smell when brass is at its best. And when it is, it's *Bristol Brass* . . . brass sheet, rod and wire made *Bristol Fashion*. The BRISTOL BRASS Corporation. Since 1850, makers of Brass strip, rod and wire in Bristol, Connecticut. Bristol Brass has offices or warehouses in Boston, Buffalo, Chicago, Cleveland, Dayton, Detroit, Milwaukee, New York, Philadelphia, Pittsburgh, Rochester, Syracuse *and for brass forgings, too* . . . Accurate Brass Corp. (subsidiary of The Bristol Brass Corp.), Bristol, Connecticut.

"BRISTOL FASHION" MEANS BRASS AT ITS BEST

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.038	.048-.061	.077-.096	.136-.250
1100, 3003	47.8	47.3	46.2	45.1
5052	54.2	53.0	50.8	49.2
6061-0	51.0	49.8	47.9	46.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	44.7-46.2	53.2-60.8
18-32	45.2-46.8	57.7-79.9
33-38	48.8-51.4	83.3-94.5
39-44	58.7-62.4	99.9-121.0

Screw Machine Stock—2011-T-3

Size"	¼	⅜-⅝	¾-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.13	.....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	.....	48.68	58.78
Munts Metal	53.20	.....	48.26	.....
Comm. Bs.	56.17	56.46	55.86	59.48
Mang. Bs.	58.86	.....	52.21	.....
Phos. Bs. 5%	77.44	.....	78.19	.....

Free Cutting Brass Rod 36.06

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; Bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.50
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base ... $ 1.31
Cobalt, 97-99% (per lb) ... $1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 29.95 to 36.95
Gold, U. S. Treas., per troy oz.... $35.00
Indium, 99.9%, dollars per troy oz. $ 2.25
Iridium, dollars per troy oz... $75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $211 to $214
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz.. $24 to $26
Platinum, dollars per troy oz.. $82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.)..... 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 30.75
- No. 120 ..... 29.75
- No. 123 ..... 28.75

80-10-10 ingot
- No. 305 ..... 35.25
- No. 315 ..... 33.00

88-10-2 ingot
- No. 210 ..... 44.00
- No. 215 ..... 40.75
- No. 245 ..... 36.00

Yellow ingot
- No. 405 ..... 24.75

Manganese bronze
- No. 421 ..... 29.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 26.25-26.50
- 0.60 copper max. 26.00-26.25

Piston alloys (No. 132 type).. 28.00-29.00
No. 12 alum. (No. 2 grade)... 24.75-25.25
108 alloy 25.25-25.75
195 alloy 27.75-28.75
13 alloy (0.60 copper max.)... 25.75-26.00
AXS-679 (1 pct zinc) 25.00-26.00

(Effective Feb. 23, 1960)

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 25.25-26.25
Grade 2—92-95% 24.00-25.00
Grade 3—90-92% 23.00-24.00
Grade 4—85-90% 22.50-23.50

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22¼	20¼
Red brass	25¾	25
Comm. bronze	26½	26
Mang. bronze	20¾	20
Free cutting rod ends.	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 29¼
- No. 2 copper wire 26
- Light copper 23¾
- *Refinery brass 24¼
- Copper bearing material 23½

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 30
- No. 2 copper wire 25
- Light copper 23
- No. 1 composition 22
- No. 1 comp. turnings 21½
- Hvy. yellow brass solids 16
- Brass pipe 15½
- Radiators 16¾

Aluminum

- Mixed old cast. ..... 14½—15½
- Mixed new clips ..... 17 —17½
- Mixed turnings, dry ..... 15 —16

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

- No. 1 copper wire ..... 25¾—26¼
- No. 2 copper wire ..... 22¼—22¾
- Light copper ..... 20¾—21¼
- Auto radiators (unsweated). 14 —14½
- No. 1 composition ..... 18¼—18¾
- No. 1 composition turnings.. 16¾—17¼
- Cocks and faucets ..... 14½—14¾
- Clean heavy yellow brass ... 12½—13
- Brass pipe ..... 14½—14¾
- New soft brass clippings .... 14¾—15
- No. 1 brass rod turnings .... 12 —12¼

Aluminum

- Alum. pistons and struts .... 7½— 8
- Aluminum crankcase ..... 11¼—11¾
- 1100 (2s) aluminum clippings 15 —15½
- Old sheet and utensils ..... 11¼—11¾
- Borings and turnings ..... 7 — 7½
- Industrial castings ..... 11¼—11¾
- 2020 (24S) clippings ..... 12½—13

Zinc

- New zinc clippings ..... 7 — 7¼
- Old zinc ..... 4½— 5
- Zinc routings ..... 3¼— 3½
- Old die cast scrap ..... 2¾— 3

Nickel and Monel

- Pure nickel clippings 52-54
- Clean nickel turnings 40
- Nickel anodes 52-54
- Nickel rod ends 52-54
- New Monel clippings 28-29
- Clean Monel turnings 20-23
- Old sheet Monel 24-26
- Nickel silver clippings, mixed 18
- Nickel silver turnings, mixed 15

Lead

- Soft scrap lead ..... 8 — 8¼
- Battery plates (dry) ..... 3 — 3¼
- Batteries, acid free ..... 2 — 2¼

Miscellaneous

- Block tin ..... 75 —76
- No. 1 pewter ..... 55 —56
- Auto babbitt ..... 39 —40
- Mixed common babbitt ..... 9¾—10¼
- Solder joints ..... 13¼—13¾
- Siphon tops 41
- Small foundry type ..... 9¾—10¼
- Monotype ..... 9¾—10¼
- Lino. and stereotype ..... 8¾— 9
- Electrotype ..... 7½— 7¾
- Hand picked type shells .... 5¼— 5¾
- Lino. and stereo. dross ..... 2¼— 2¾
- Electro dross ..... 2¼— 2¾

V-R CREATING THE METALS THAT SHAPE THE FUTURE

Quality carbide starts with purity

There's no secret to producing quality carbide at V-R because it's a simple matter of starting with highest purity raw materials and maintaining this purity and uniformity throughout all processes.

At V-R, the finest in modern equipment is effectively combined with the metallurgical knowledge gained through 30 years of carbide research and manufacturing experience . . . *this experience means better carbide for every use.*

Above is a good example of V-R's quality control. This X-Ray Fluorescent Spectrograph tells the exact composition and amount of each component in the material being tested — assuring purity of raw materials and uniformity of powdered metal compositions.

V-R VASCOLOY-RAMET

814 MARKET STREET • WAUKEGAN, ILLINOIS

C-775

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3 B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Bridgeport, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3,* $114.00 *T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1; C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.80 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective Feb. 23, 1960)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* 1.25-lb. base box	Electro** 0.25-lb. base box	Holloware Enameling 29 ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75 lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*			7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*		7.225 *E2*				6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*										
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

* Electrogalvanized sheets.

(Effective Feb. 23, 1960)

**7.425 at Sharon-Niles is 7.225

STEEL PRICES

Italics identify producers listed in key at end of table. **Base prices**, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3* 6.475 *T5*	9.025 *R3,R2* 8.775 *T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, S12*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Feb. 23, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Chicago, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.
Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (net) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

* Threads only, buttweld and seamless, 2½ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount. Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1¾ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

(Effective Feb. 23, 1960)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	Plate (*L4, C4, A3, J2*) 15 pct	Plate (*L4, C4, A3, J2*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 44.20; 1 side, 36.80.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

COKE

	Net-Ton
Furnace, beehive (f.o.b.)	
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Ironton, O., f.o.b.	30.50
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	GRAPHITE Length (In.)	GRAPHITE Price	CARBON* Diam. (In.)	CARBON* Length (In.)	CARBON* Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12 55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

(Effective Feb. 23, 1960)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Baie Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	175	192	...	214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	9.10	9.775
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*****	173	190	177	212	196	9.00	9.70
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	192	...	214	198	9.10	9.775
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	...	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9*	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	187	217	198†	9.25	9.80†
Monessen *P6*	.....	.....	.....	.....	193	8.65	9.325
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.60	10.15
Rankin, Pa. *A5*	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50†
Sparrows Pt. *B3***	175	.....	.....	214	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 11-12¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Chicago	.....	.....	.....	15.60	.....
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders

Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.50
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10

Copper Powders

Molding Grades

Electrolytic, domestic f.o.b. shipping point	49.25
Precipitated	49.50
Atomized	39.80 to 48.30
Hydrogen reduced, f.o.b.	49.25
Bronze	47.20 to 51.50
Chromium, electrolytic	$5.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	$3.60 to $3.95
Nickel	$1.05 to $1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	$1.07
Stainless Steel, 316	$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.25+%, per lb., f.o.b.	$11.25
Tungsten	$3.15 (nominal)

* F.O.B., shipping point.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Bolts	1-4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine				
½" and smaller x 3" and shorter	55	57	61	62
⅝" diam. x 3" and shorter	47	49½	54	55
¾" thru 1" diam x 6" and shorter	37	39½	45	46
¾" thru 1" diam. longer than 6" and 1½" and larger x all lengths	31	34	40	41
Rolled thread, ½" and smaller x 3" and shorter	55	57	61	62
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts ½" and smaller x 6" and shorter	48	50½	55	56

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
C. P. Hex, reg. & hvy.	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	41
Semi-finished Hex Nuts	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
(Add 25 pct for broken case or keg quantities)	
Finished	
⅞ in. and smaller	65

Rivets	*Base per 100 lb*
½ in. and larger	$12.85
	Pct. Off List
7/16 in. and smaller	15

Cap Screws	*Discount (Packages)*
	Full Finished H. C. Heat Treat
New std. hex head, packaged	Full Case
⅝" diam. and smaller x 6" and shorter	54	42
¾", ⅞", and 1" diam. x 6" and shorter	38	23
⅝" diam. and smaller x longer than 6"	..	..
¾", ⅞", and 1" diam. x longer than 6"	..	..

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	59	48
¾" through 1" dia. x 6" and shorter	45	32

Minimum quantity—¼" through ⅝" diam., 15,000 pieces; 7/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish	Discount Mach. Screws	Stove Bolts
Cartons	60	60
Bulk		
Quantity		
To ¼" diam. incl. — 25,000-and over	60	..
5/16 to ½" diam. incl. — 15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

	Discount Hex	Square
In Cartons	16	19
Quantity		
In Bulk		
⅜" diam. & smaller — 25,000-and over	15	16

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	48.00
Electrodeposited	40.00
Brass, 80-20, ball anodes, 2000 lb or more	53.00
Zinc, ball anodes, 2000 lb lots	19.75
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium, 5000 lb	1.30
Tin, ball anodes $1.05 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	27.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.70
(Philadelphia price 25.00)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24				
Baltimore**	.10	9.90	10.10	10.16	11.55	10.00	10.65	10.15	11.90	17.48	16.48	21.58	20.83
Birmingham**		9.43	10.20	10.46	10.91	9.79	10.00	9.59	13.14	16.76			
Boston**	.10	10.52	11.27	11.87	12.17	10.42	10.72	10.34	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	8.95	10.10	11.30	10.80	10.25	9.80	9.15	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.69	10.35	11.10	10.35	8.62	9.28	8.79	10.80	17.10	16.10	19.70	20.45
Cincinnati**	.15	8.86	10.41	11.10	10.67	9.00	9.84	9.11	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.88[1]	10.03	11.29	10.66	9.07	9.90	9.11	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19				20.84
Detroit**	.15	8.95	10.61	11.40	10.72	8.99	9.84	9.10	11.16	17.38	16.38	21.48	21.03
Houston**		10.13	10.60	12.19	11.28	9.47	9.34	9.42	13.10	17.50	16.55	21.55	20.85
Kansas City**	.15	9.36	11.02	11.50	11.02	9.25	9.95	9.46	11.72	17.17	15.87	21.87	21.12
Los Angeles**		9.95[1]	11.55	12.20	11.55	10.00	10.00	9.75	14.20	18.30	17.35	22.90	22.20
Memphis	.15	8.55	9.80		8.60	8.93	9.01	8.97	12.11				
Milwaukee**	.15	8.83	10.49	11.24	10.49	8.76	9.50	8.93	11.04	17.24	15.34	21.24	19.09
New York	.10	9.27	10.59	11.45	9.74	9.87	9.84	10.09	13.35	16.16	15.60	20.10	19.35
Norfolk	.20	8.20			8.90	8.65	9.20	8.90	10.70				
Philadelphia	.10	8.30	9.35	10.99	9.35	9.25	9.20	9.50	12.05	16.58	15.58	20.08	19.13
Pittsburgh**	.15	8.88	10.03	11.18	10.64	8.83	9.51	9.00	11.40	17.10	16.10	19.70	20.45
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30	18.50	17.45	20.75	20.25
San Francisco**	.10	11.00	11.95[2]	11.65	12.25	11.00	10.95	10.75	15.20	18.30	17.35	22.90	22.20
Seattle**		11.55	12.30	12.50	12.65	11.00	10.20	11.10	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	11.70	12.45	12.65	13.30	11.15	11.35	11.75	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.79	10.73	11.48	10.45	8.73	9.40	8.90	11.43	17.48	16.48	21.58	19.33
St. Paul**	.15	9.19	9.74	10.89	10.81	9.10	9.78	9.27	11.64		16.69		21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1": Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter.

(Effective Feb. 23, 1960)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	.....
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	.....
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4*, (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.); $64.00.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25-31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown. *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7,* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

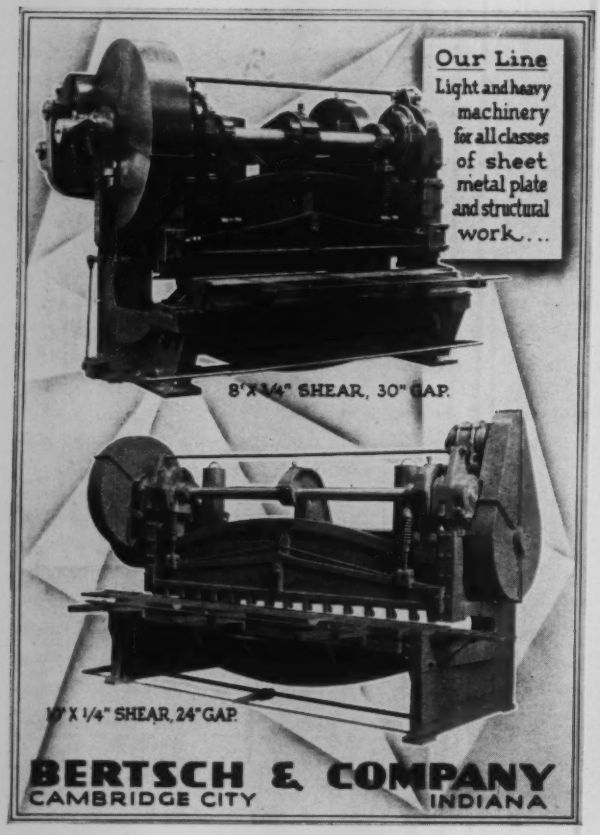
Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet. *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

(Effective Feb. 23, 1960)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CHUCKING MACHINES
Tool Rotating
GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 37.25
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 28.25
0.025% C (Simplex) 36.75
5-7% C, 61-65% Cr, 5-8% Si 22.00
5% max C, 50-55% Cr, 2% max Si.. 25.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.
0.10% max. C $1.29
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (¼" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.
Carloads $1.15
Ton lots 1.17
Less ton lots 1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.
Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	28.25	14.60
Ton lots	33.50	16.05
Less ton lots	35.10	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.
Carloads, bulk 24.00
Ton lots 27.95
Less ton lots 29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.
Carloads, bulk 23.00
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.
Ton lots 21.15
Less ton lots 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.
Carload lots 18.45
Ton lots 19.95
Less ton lots 21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.
Carload bulk 19.20
Ton lots to carload packed 21.15
Less ton lots 22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	11.00
S. Duquesne	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content.
Briquets, delivered, 66 pct Mn:
Carloads, bulk 13.70
Ton lots packed in bags 16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

Mn	Palmerton, Pa. 10 lb, pig	35 lb, down	Neville Is., Pa. 35 lb
16-19% ..	$98.00	$96.00	$100.50
19-21% ..	100.00	98.00	102.50
21-23% ..	102.50	100.50	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.
Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.
Carloads, bulk 34.25
Ton lots, palletized 36.25
250 to 1999 lb 39.00
Premium for Hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% (Bulk) P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C.	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.
Carloads bulk 11.60
Ton lots, packed 13.25
Carloads, bulk, delivered, per lb of briquet 14.00
Briquets, packed pallets, 2000 lb up to carloads 16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe..	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.
Carloads, bulk 8.00
Ton lots, packed 10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.
50% Si.... 14.60 75% Si.... 16.90
65% Si.... 15.75 85% Si.... 18.60
90% Si.... 20.00

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.
Openhearth 3.20
Crucible 3.30
High speed steel 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.55

(Effective Feb. 23, 1960)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.
Carloads, bulk ..... 9.85¢
Ton lots ..... 11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, delivered per pound
Ton lots $3.45
Less ton lots..... 3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $255.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.
Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
Less ton lots ..... 21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, fo.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots.. $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up
10 to 14% B ..... .85
14 to 19% 1.20
19% min. B 1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over
No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.
Ton lots (packed) $1.46
Less ton lots (packed) 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

ELECTRICAL POWER EQUIPMENT IN STOCK

DC MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	3900	New Elliott	Enc. S.F.	475	320
1	3900	New G.E.	Enc. S.F.	475	320
1	3000	New Whse.	Enc. F.V.	525	600
2	2700	G.E.	MCF	415	280
1	2250	New Elliott	Enc. S.F.	600	200/300
1	2250	New G.E.	Enc. S.F.	600	200/300
1	2200	G.E.	MCF	600	400/500
2	2000	G.E.	MCF	350	230/350
2	1750	G.E.	MCF	250	175/350
4	1500	New Whse.	Enc. F.V.	525	600
2	1400	G.E.	MCF	250	165/300
1	1300	G.E.	MCF-12	300	200/400
1	1200	G.E.	MCF	600	450/600
1	1000	Whse.		500	800/2000
4	1000	GM	D8	600	600/900
2	940	S.S.	Enc. F.V.	600	800/1000
2	800	G.E.	MCF	250	400/750
2	765	Allis Ch.	MHC	550	1012/1350
2	750	G.E.	MCF	600	450/900
1	750	G.E.	M.F.	600	120/360
4	600	Whse.		250	275/550
1	500	G.E.	MPC-10	250	188/400
2	450	Whse.		550	415
4	400	GM.	D8	250	300/900
2	400	G.E.	CY-275	300	1000/1500
2	325	Allis Ch.	MHC	250	450/900
1	300	Cr. Wh.	H-102 B.B.	230	1200
1	200	Rel.B.B.	T-664-D.P.	240	850
1	150	Cr.Wh.	CMC-65H	230	1150
1	150	G.E.B.B.	CD	600	250/750
1	150	G.E.B.B.	CDP-115	250	1750
1	120	G.E.B.B.	TLC-50	250	1950/5000
1	100	Whse.	SK-180	230	450/1100
1	100	G.E.	CDP-145	230	1750
1	80	Whse.	SK-123.9	240	2000-4500
1	75	G.E.B.B.	CD-1235-D.P.	600	850

MERCURY ARC RECTIFIERS

3—150KW, G.E., Sealed Tube Ignitron Unit Substation load centers 275 V. D.C., 2300 V. A.C. Pyranol filled transformers complete.
2—150 KW., G.E., Ignitron, 245 V. D.C.—230 V. A.C. air cooler transformers with controls.

MG SETS—3 Ph. 60 CY.

Qu.	K.W.	Make	RPM	DC Volts	AC Volts
1	2000	G.E.	514	600	2300/4600
2	1750/2100	G.E.	514	250/300	2300/4600
1	1700	G.E.	514	600	2300/4600
1	1500	G.E.	720	600	6600/13200
1	1500	Cr.Wh. 4 unit	720	100	2300
1	500	G.E.	900	125/250	440
1	500	G.E.	900	250	2300/4600
1	500	G.E.	1200	300	2300
1	350	G.E.	900	125	440/2300/4160
1	300	G.E.	1200	250	2300/4000
1	300	G.E.	1200	250	440/2300
1	250	G.E.	900	250	440/2300
1	240	Whse.	900	125	220/440
1	200	Whse.	1200	550	2200
1	200	El. Mhy.	1200	250	2300/4600
1	150	G.E.	1200	275	2300
1	150	Whse.	1200	275	2300
1	150	G.E.	1200	250	440
1	150	G.E.	1200	125	440
1	140	Cr.Wh.	690	125/250	2300
1	100	G.E.	1170	250	220/440
2	100	Cr.Wh.	S1160	525	220/550
1	100	G.E.	1200	250	2400/4100
2	75	Whse.	1200	125	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
3	3333	Whse.	OISC	1	13800 x 2300
3	1000	G.E.	OA/FA	1	13800 x 230/460
3	833	A.C.	OISC	1	4800/2400 x 480
3	833	A.C.	OISC	1	10175/13475x 2300/4000
2	750	G.E.	Pyranol	1	4800x85/55-255/165
3	500	Mal.	C	1	6600/11430Yx480
3	500	Kuhl	OISC	1	13200 x 6600
3	150	G.E.	OISC	1	33000x2300/4000Y
3	100	G.E.	HS	1	4800/8320Y x 120/240

CRANE & MILL MOTORS

230 V. D. C.

Qu.	H.P.	Make	RPM	Type
12	12/14	Whse.	700/600	MCA-30, Series
1	20	Whse.	975	K-5 Series
2	23	G.E.	650	MDS-408
1	35	Whse.	480	CK-9 Comp. S.B.
1	35	Whse.	480	CK-9 Sh. R.B.
1	45	Whse.	600	CK-9 Comp. S.B.
3	50	G.E.	650	COM-1830 Comp.
2	50	Whse.	525	CK-9 Shunt R.B.
2	50	Whse.	600	CK-9 Comp. R.B.
1	50	G.E.	525	COM-1830AEB.B.
1	50	Cr.Wh.	550	SW-50 Comp.
1	100	G.E.	475	CO-1832 S.B.
6	100-140	Whse.	500/415	MC-90 R.B.

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W. Coast Dealers Have Slow Start

Used machine dealers on the West Coast expected 1960 to start off with heavy sales.

This hasn't happened, but feelings there are optimistic that business will pick up before long.

▪ A fast start for a big year. That was the 1960 prediction by West Coast used machinery dealers.

They still look for the big year. But it's not with a fast start.

Why the slow-up? Cancellations and cutbacks on major military aircraft projects. A rash of auctions of both privately-owned and government equipment. A March California inventory tax.

Defense Cuts Hurt — Defense Dept. orders some months ago killed off the F-108 fighter plane. And reduced the B-70 bomber project to a prototype only. Small shops in southern California that tooled up for these planes are now auctioning off their equipment.

Here's what they're putting on the market: No.'s 2 and 3 milling machines; No.'s 3, 4 and 5 turret lathes; and a wide variety of other light metalworking equipment. Dealers were the big buyers.

East and West—During January and February several government auctions a week put more machines on the market. Dealers, however, ran into pretty stiff competition in the bidding. For the first time in years, eastern and midwestern metalworking firms came west looking for bargains.

Bids for the government machines ran high: 35 to 45 pct of the original cost for cutting tools, lathes, milling cutters, planers and shapers.

These auctions slowed the used machinery sales pace. Dealers lost a lot of business. Their prospects outbid them at the auctions.

Dealers in northern California are not dancing in the streets with joy over high sales these days. However, they're not in the dumps either.

Average but Promising—"Things are average," one dealer told The IRON AGE in summing up the picture. But he and others checked agree that the outlook after the first quarter is "promising."

Dealers report many inquiries and say it takes "work to get what sales we are getting."

Settlement of the steel strike cleared the air considerably. But the California inventory tax forces many prospects to hold off in buying equipment until after March 7. That's the day on which this tax is computed.

After the Tax—Most feel that once this tax deadline is out of the way, business will perk up. None would venture a guess as to how much—"it's too early to tell yet."

There are no shortages of any items. Standard machine shop equipment—lathes and milling machines—are moving best.

Financing is no problem, dealers say. Money is expensive but not too tight for capital equipment, they report.

REBUILT—GUARANTEED ELECTRICAL EQUIPMENT

SLIP RING MOTORS
3 Phase—60 Cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
1	3500	G.E.	Mill	6600/4160	240
1	2500	G.E.	Mill	2300	296
1	1800	Whse.	Mill	2300	252
1	1500	G.E.	Mill	6900/4160	444
1	1200	G.E.	Mill	2200	295
1	1000	Whse.	C.W.	2300	441
1	500	Ideal	S-4-20	4800	708
1	500	Al Chal.	ANY	2200	595
1	500	Al Chal.	ANY	2200	293
1	400	Al Chal.	ANY	2200	505
1	400	Whse.	CW	2200	290
1	350	G.E.	I-M	2200	1180
1	350	G.E.	MT-412	2200	450
1	300	Whse.	CW-1012	2200	704
1	250	Whse.	CW	4160/2400	710
1	250	G.E.	MT-414	2200	300

SYNCHRONOUS MOTORS
3 Phase—60 Cycle

Qu.	H.P.	Make	P.F.	Volts	R.P.M.
1	6000	G.E.	Unity	2300	90
1	1750	G.E.	Unity	2200	3600
1	1500	Whse.	80%	2300	514
2 (new)	1400	Whse.	80%	4160	450
1	900	G.E.	Unity	460	300
1	700	El.Mchy.	Unity	440	200
1	500	El.Mchy.	80%	2300/440	720
1	450	Whse.	Unity	2200	128
1	300	G.E.	80%	2200/440	600

TRANSFORMERS
Outdoor—Oil Cooled—60 Cycle

Qu.	KVA	Make	Ph.	Prim.	Sec.
1	300	Whse.	3	11500	440
9	333	Amer.	1	2400/4160	120/240
1	450	Whse.	3	6900/11930	460
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1⅛" RG CG	Carpenter #883	10,000#

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SIZE	TRADE NAME	WEIGHT
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5" Rd	Leco	5,900#
4¼" Rd	"CFS"	6,100#
4⅛" Rd	Crucible Dbl. Spec.	14,700#
3" Rd	Carp. "K.W."	24,000#
.655 Rd.	AMS 5132	16,000#
1¾" x 1"	Silver Star	33,300#
1½" x 1"	Silver Star	1,700#

OIL HARDENING

SIZE	TRADE NAME	WEIGHT
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1¾" x 2"	"711"	6,000#
⅞" Rd	"711"	12,500#
9/16" Rd	Magic Chisel	44,700#
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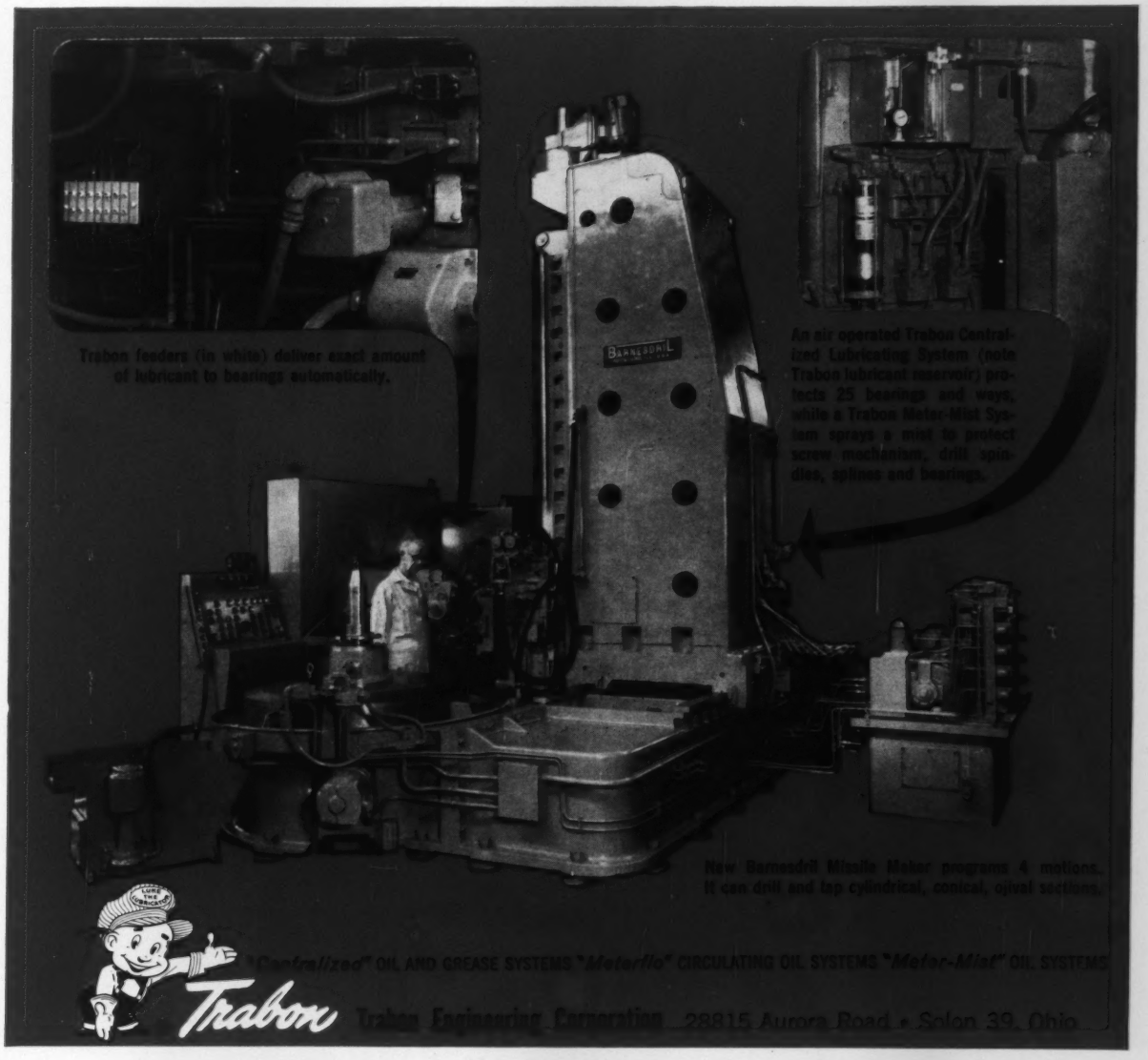

Trabon feeders (in white) deliver exact amount of lubricant to bearings automatically.
An air operated Trabon Centralized Lubricating System (note Trabon lubricant reservoir) protects 25 bearings and ways, while a Trabon Meter-Mist System sprays a mist to protect screw mechanism, drill spindles, splines and bearings.
New Barnesdril Mitelle Maker programs 4 motions. It can drill and tap cylindrical, conical, ojival sections.
"Centralized" OIL AND GREASE SYSTEMS "Meterflo" CIRCULATING OIL SYSTEMS "Meter-Mist" OIL SYSTEMS
Trabon
Trabon Engineering Corporation 28815 Aurora Road • Solon 39, Ohio

"In modern manufacturing, electrical control equipment is the very heart of mechanized and automatic operation. Because our plants have become so dependent on this equipment, the cost of 'down time' for any control failure is simply staggering. And, according to many manufacturing engineers, limit switches are the worst offenders, accounting for as much as 70% of all interruptions due to control failures."

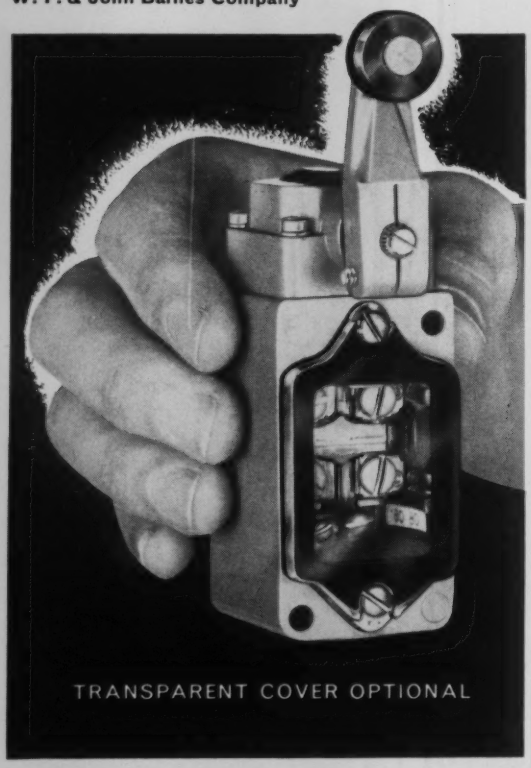
Mr. J. S. Wilford, Editor
PRODUCTION Magazine

"At least 60% of the electrical failures causing downtime of the production machinery used in manufacturing home appliances at the Whirlpool Corporation can be traced to faulty limit switch operation. An analysis of the switch failures reveals the inability of limit switches to meet the requirements of high production equipment such as is widely used in our St. Joseph Division."

Mr. C. R. Burg, Maintenance Engineer,
Whirlpool Corporation

"75% of the electrical failures on our machines can be traced directly to limit switch malfunctions. This problem is particularly aggravating to us because we are responsible for the successful operation of our machines, and their components on our customer's floor. We have spent a great deal of time engineering protective mounting schemes to compensate for the inability of today's limit switches to check the seepage of corrosive coolants and microscopic grit."

Mr. N. P. Bashor, Director Electrical Division,
W. F. & John Barnes Company



PRODUCTION'S ENEMY #1 MEETS ITS MASTER

Cutler-Hammer announces the first

- ***Tolerance Compensated***
- ***Contamination-proof***
- ***Visible Contact***

Extended Life Limit Switch

The new Cutler-Hammer Extended Life Limit Switch installs easier, works better, and lasts longer than any of the "oil-tight" limit switches now in use. Exhaustive tests, including total-submersion life tests, confirm this fact! But don't take our word for it. Try it . . . Test it . . . Compare it. The new Cutler-Hammer Extended Life Limit Switch is completely interchangeable with any widely used limit switch. Replace your most troublesome limit switch installation with this new tolerance compensated, contamination-proof, visible contact Cutler-Hammer Limit Switch; and it will work better, last longer than any other you have ever used. This is the answer to your limit switch problems.
For descriptive data write for Publication ED143-C246.
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